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ANNUAL AIR TRANSPORT PROGRESS ISSUE

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Aeronautical Controls







Trends

Airlines of the world grossed $1.7 billion last year. This year or next, world air transport will become a **two billion dollar business,** half of this within the U. S.

•

Total world air traffic has doubled in the past five years. In 1951, 39 million passengers were carried—an average daily lift of 107,000.

•

Air service continues to expand. At the end of last year the total world mileage approximated 750,000 miles and reached into 140 countries.

•

Airlines will be devoting more attention from now on to airports and civic affairs. Closing of Newark Airport brought action in the U. S. Also, there's strong movement among airport operators to set maximum noise level standard, maximum runway length and maximum weight per wheel on runways.

•

Manufacturers are going to have to start designing commercial aircraft to meet requirements of communities as well as airlines, especially for noise, runway length and wheel weight. Top engineers have admitted they can do something about noise—now they'll be expected to produce.

•

Higher operating costs and greater ton-mile capacity have dimmed airlines' financial outlook for 1952. Operating incomes were off sharply for first two months.

•

Here's what happened to the 15 trunks: operating income dropped from $6,394,000 in January, 1951, to $2,882,000 in January, 1952. Only Delta and National did better this year than last, although Northwest cut its loss for that month.

•

February looks worse than January for those airlines reporting to date. Instead of total operating income of $1,882,000 for 11 lines reporting, this February showed total loss of $759,000. American dropped from $1,745,000 to $33,000.

•

Major cost factor yet to hit the airlines with full force is parts. Surplus parts are dwindling and not available for new equipment. Some real shocks are ahead.

•

Sum up the U. S. airline picture this way: it's serious, not critical. It will become critical unless remedial action is taken to boost revenues greatly. Airlines have tough financing period ahead this year and next. Outlook isn't dark but it's definitely grey and can get darker.

News At Deadline

CAB Refuses to Renew Mid-West Certificate

For the second time in the history of the local service airline experiment, CAB has refused to renew the certificate of a local carrier. By a 3-2 vote, Board found that Mid-West Airlines, now owned by Purdue Research Foundation, should terminate operations on June 30, 1952, because of "high cost" to the Government. Members Josh Lee and Joseph P. Adams dissented.

Majority claimed it would cost the Government "more than $4 for each $1 of revenue provided by users of the service" if MWA were permitted to continue. Only other line refused renewal was Florida Airways several years ago.

MWA started service October 21, 1949 to take care of service needs of cities on the MWA certificate, CAB ordered immediate hearings on the question of possible transfer of the points to trunk-line certificates. One possibility is that United would get Scottsbluff, Neb., as an intermediate on transcontinental route No. 1. Other points would, under the Board's tentative proposal, go to Mid-Continent Airlines.

Colonial Votes on New Directors, NAL Merger

Colonial Airlines' stockholders were voting as this issue went to press on directors for the coming year, and whether or not to sell the company's assets to National Airlines.

At a heated stockholders' meeting in Wilmington, Del., on Apr. 16, an Independent Stockholders Committee presented a slate of directors in opposition to the management slate. The committee also opposes the sale to NAL, and favors instead a sale to Eastern. The meeting has been recessed from day to day while the votes are counted.

Airlines Increase Local and Joint Fares by $1

Domestic scheduled airlines have been authorized to increase local and joint passenger fares $1 as a means of combatting the economic threat posed by spiralling costs. But a simultaneous proposal to eliminate the 5% round-trip discount has been turned down by CAB which has ordered a general investigation of all domestic passenger fares of certificated carriers.

The $1 increase in local fares was put into effect by some lines on April 16 and by others on April 27.

The $1 fare hike is estimated to mean an additional $16 million annually to the airlines. They would have gotten an extra $12 million if the round-trip discount elimination plan had gone through.

NAL Wins Court Stay of Southern Interchange

New southern transcontinental interchange service via Eastern, Braniff and TWA, slated to begin April 14, has been delayed indefinitely by the U. S. Court of Appeals for the District of Columbia. Acting on a National Airlines' request, the Court stayed CAB's order authorizing the interchange, pending review.

Stay was issued four days before the service was to start and came in the midst of elaborate inaugural ceremonies being held in the cities slated to receive the service. NAL's attorney John W. Cross won the stay award on arguments, that the interchange would divert $2,000 daily from National and that National did not have adequate opportunity to contest the interchange service before CAB.

No date has yet been set for further court action, but airline attorneys estimate it will be several months before a final determination can be made.

Panagra Tests DC-3 With R-2000 Engines

Tests are now underway by CAA and Pan American-Grace Airways leading to certification of the Douglas DC-3 powered by Pratt & Whitney R-2000 engines. Tests have been conducted by CAA's second region (Atlanta) at Miami, Fla., and additional tests are scheduled at Lima, La Paz and Quito in South America late this month.

The R-2000 engines would not be used to provide higher horsepower or take-off gross weights at sea level, as might be expected, but rather to improve altitude performance. Engines would be limited to the 1200 horsepower of the regular R-1830 DC-3 engine but could maintain this power, and consequently improve take-off performance and loads, up to 7,500 feet altitude. Maximum cruising power of the R-2000 is 1100 horsepower which can be maintained up to about 15,000 feet altitude. This installation would permit higher cruising speed at altitude and lower fuel consumption per horsepower.

Braniff DC-3's to Sell for $66,000 to $90,000

Braniff International Airways' fleet of 12 Douglas DC-3's will be sold at prices ranging from $65,917.50 to $90,000 concurrent with deliveries of their fleet of 20 Convair Liner 340's starting in July. Tentative schedule of sales, based on estimated deliveries, includes one plane immediately, three in July, one in November, 2 each in December, January and February and one in March.

Braniff's DC-3's ranging in total flying time from 18,846 hours to 37,943 hours, will be sold for a basic price of $65,000 per plane with no flight time, prior to overhaul, left on the airframe or engines. Total aircraft price will include the basic price plus $2.50 per hour of airframe time remaining on the aircraft up to 8,000 hours and $2.50 per engine hour still left on the engines up to 1,000 hours. Prices are based on fly-away condition, Dallas, Tex.

Low-Cost Omni

New terminal omni-range design which promises to sell for $5,000-$7,000 contrasted with over $90,000 for regular omni has been designed and built by Air Transport Association's air navigation and traffic control division. It is designed to fill a need for improved aids at 200-300 airline stops now lacking them. Tests have been conducted at Friendship International Airport, Baltimore.

Non-Sked Regulation

A proposed regulation (amendment to Part 42 of CAR) to tighten up operations of non-scheduled airlines has been released by CAA and CAB. It proposes a 30-day intensified route inspection program by CAA, more rigid pilot qualifications, and requires each non-sked to name a chief pilot and an adequate number of check pilots.

Boyer to Leave APB

Harold R. (Bill) Boyer, Aircraft Production Board chairman, is planning to leave his government post Apr. 30 and return to General Motors.

NAL Names Calhoun

C. H. Calhoun, former vice president of Mid-Continent Airlines, has been named system director of maintenance and engineering by Nation Airlines. Calhoun had been with MCA since 1943 and for 14 years prior to that was with TWA in supervisory positions.

(*More news on page* 149)

Greater Safety for Sub-Killers!



Installing Goodyear bullet-sealing tank in wing of Lockheed P2V-5. Smaller picture shows latest production model of this plane in flight.

PRIME antisubmarine patrol plane of the U. S. Navy is the Lockheed P2V-5 "Neptune"—one of a long series of military and naval aircraft to rely on Goodyear bullet-sealing fuel tanks for added protection.

Tanks used in the "Neptune" are lineal descendants of the first practical airplane self-sealing tank developed by Goodyear at the end of World War I and the improved tank standard in U. S. Military craft in World War II. It features a lining of synthetic rubber and cord in a completely nonmetal tank—effectively seals itself when punctured.

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ABC April 28, 1952 Vol. 15 No. 44 ABP

Billion Dollar Equipment Market—But No Jet 17
Civil Air Carriers Gear for Military Role 23
U. S. Flag Lines Dominate Pacific Airlift 26
Large 'Copters Prove Worth in Combat 30
MATS Operations Built Around Variety of Services 34
Airline Income at Record High—Taxes, Too 40
Total Airline Assets Near $1 Billion Mark 44
Backlogs Accumulate for Manufacturers: Financial Profile 46
World Airlines: 39 Million Passengers in '51 67

International

Foreign Carriers Flew More Atlantic Trips 72
World Airline Transports 80% U. S.-Made 76
Britain Eyes Transport Leadership 78
France Ponders New Plane Projects 80

Operations—Maintenance

Safety Record Reflects Industry Efforts 85
Direct Operating Costs Rise, Take Indirect Along 87
Engine Overhaul Periods Continue to Lengthen 93
Seating Changes Made 1951 Coach Fares Possible 101

Traffic

Air Miles Top Pullman for First Time 103
Coach Revenues Over $56 Million in '51 103
Air Freight Rate of Growth Slows Down 107
Non-Skeds Carry 600,000 in Boom Year 109
Employe Productivity Doubles in 5 Years 115
Taxes Exceed Trunkline Mail Pay 117

General

Defense Slows Non-Carrier Production 125
Worldwide Airline Directory 126

The 13th edition of 'Air Transport Facts and Figures', compiled by the Air Transport Association of America, is included as a special feature of this issue, beginning opposite page 70.

other publications

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When & Where

May 5-7—Symposium, "Progress in Quality Electronic Components," sponsored by Institute of Radio Engineers, American Institute of Electrical Engineers, and Radio & Television Manufacturers Assn., Dept. of Interior Auditorium; registration, Roger Smith Hotel, Washington, D. C.

May 8-9—Fifth Annual Wisconsin Aeronautics Conference, Green Bay, Wisconsin.

May 9-10—National Aeronautic Assn., National Air Meet, Stillwater, Okla.

May 12-14—Institute of Radio Engineers, National Conference on Airborne Electronics, Dayton Biltmore Hotel, Dayton, Ohio.

May 14-16—Society for Experimental Stress Analysis, Spring Meeting, Lincoln Hotel, Indianapolis, Ind.

May 15-16—American Helicopter Society, 8th Annual Forum, Washington Hotel, Washington, D. C.

May 15-16—Southeastern Airport Managers' Assn., semi-annual meeting, Jacksonville, Fla.

May 17-18—National Pilots Air Meet and Races, Chattanooga, Tenn.

May 22-24—American Society for Quality Control, Sixth Annual Convention, Syracuse, N. Y.

May 25—Chicago Air Fair, Midway Airport, sponsored by Chicago Junior Assn. of Commerce & Industry.

June 1-3—Airport Lighting Conference, sponsored by American Association of Airport Executives, Deshler-Wallick Hotel, Columbus, O.

June 1-6—Society of Automotive Engineers, Summer Meeting, Ambassador and Ritz-Carlton Hotels, Atlantic City, N. J.

June 10—National Fire Protection Association, Special Aviation Seminar, Statler Hotel, New York.

International

Apr. 28—IATA Warsaw Convention Special Committee, Bermuda.

Apr. 30—IATA Legal Committee, Bermuda.

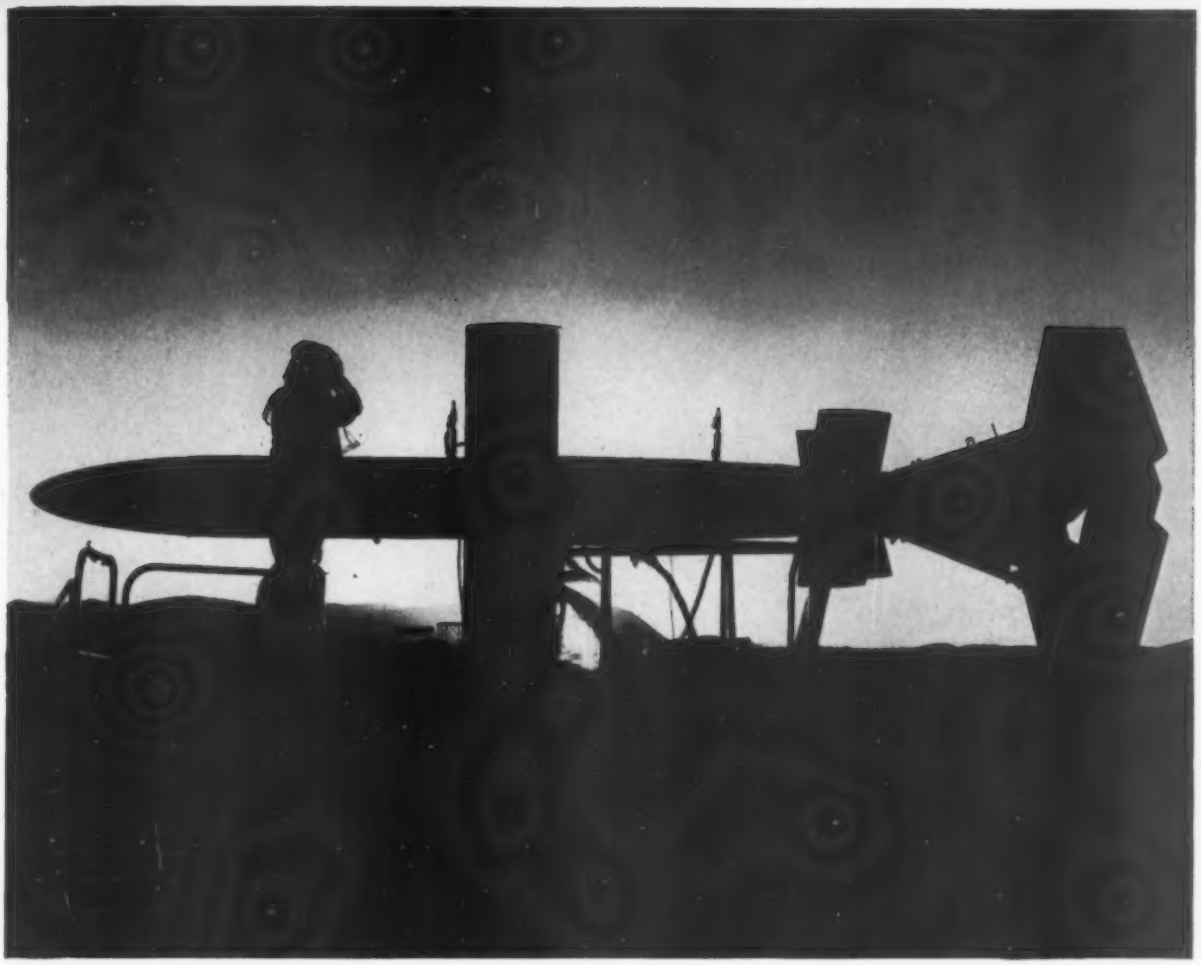
May 5—IATA, Fifth Annual Technical Conference, Copenhagen, Denmark.

May 11—IATA Traffic Committee, 15th Meeting, Buenos Aires.

May 12—IATA Clearing House & Revenue Accounting Sub-Committee, Rome.

May 19—IATA, Technical Committee, Thirteenth Meeting, Copenhagen, Denmark.

May 27—ICAO, Sixth General Session, Montreal.



ADVANCED TRAINER...

FOR THE FIRST GUIDED MISSILES GROUP, U.S. ARMY

The United States Army Field Forces today is training its first Guided Missiles Group with Fairchild Missiles. In firing these advanced type anti-aircraft missiles, the Army Field Forces is preparing now for the day when missile batteries will defend cities and vital military installations.

Firing on the desert missile range at Ft. Bliss, Texas, officers and enlisted cadres are learning the skills and techniques necessary for the tactical application of these new weapons under conditions similar to those in actual combat.

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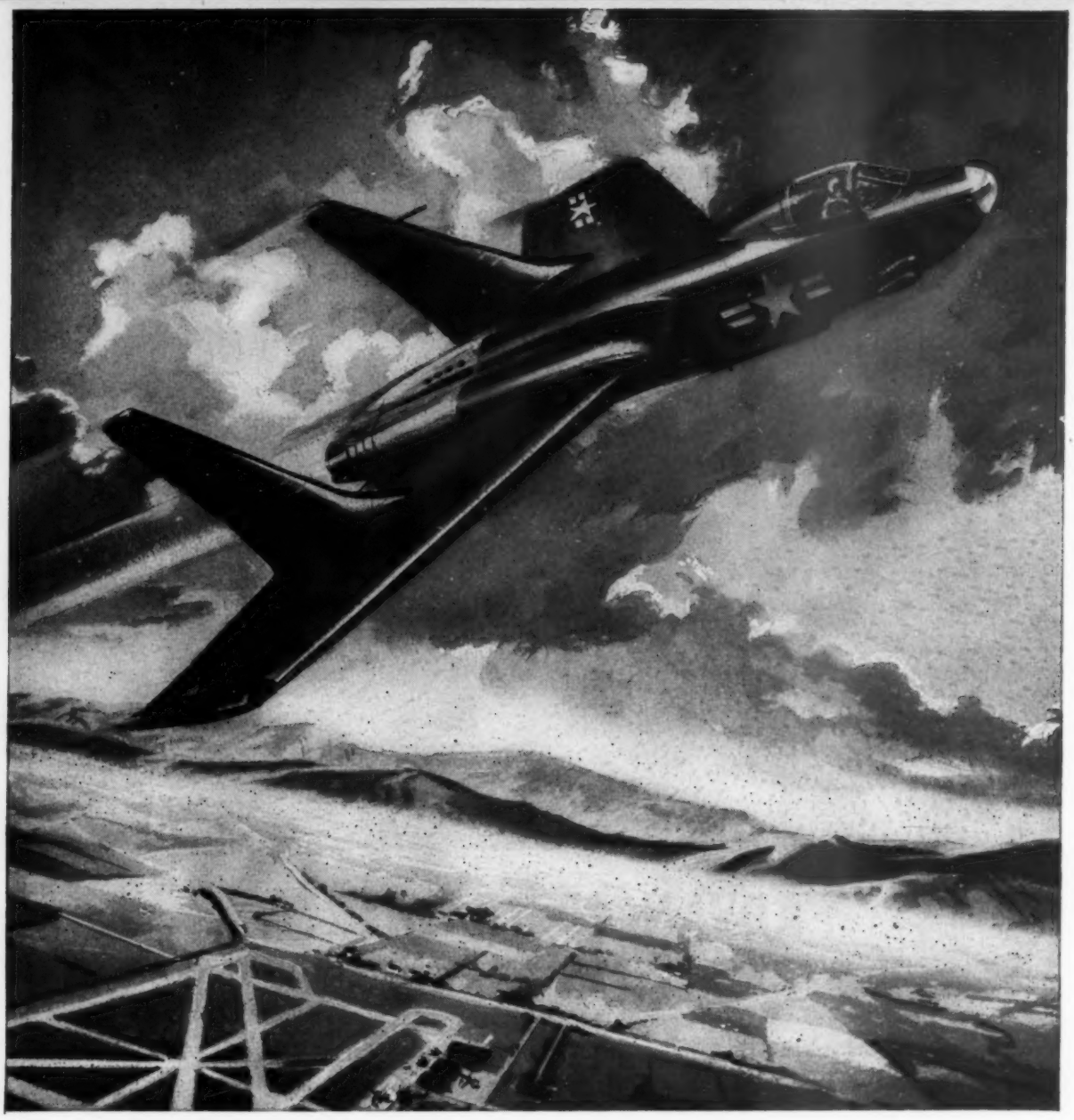
The Fairchild Plant at Wyandanch, L. I.—The World's First Privately Built Missile Plant

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The F7U-3 Cutlass, designed by Chance Vought Aircraft's engineers to outfly or out-fight any other carrier-based fighter in the world, has made its initial flight.

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The new version is being produced to give the U. S. Fleet a fighter with superior high-altitude performance, greater range, greater rate of climb, exceptional maneuverability and the firepower to deliver deadly blows in combat.

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ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION

Appraisal—1951-1952

ON the occasion of this third annual review of world air transport, the most concise appraisal of the health of the industry is to be found in the words of Per A. Norlin, president of Scandinavian Airlines System.

"A few years ago during the 1947 airline financial crisis," he says, "we were telling our bankers and our governments that 'it isn't as bad as it looks.' Today, with several prosperous years behind us we are having to tell those same bankers and those same governments that 'it isn't as good as it looks.'"

What Mr. Norlin means is that after several years of achieving economic benefits from new equipment providing lower ton-mile costs, of achieving greater efficiency, and of expanding traffic, the inflationary cost trend is again catching up with all or at least most of the airlines of the world. What he means is that the net income figures for 1950 and 1951 should not be used as a guide to 1952 and 1953.

In the United States, particularly, there is an additional factor to higher costs that is playing a major role in dampening the outlook for 1952 in comparison with the two previous years. This factor is available seat-miles. Fleet additions are providing a vast expansion of seat capacity at a time when fixed costs per ton-mile such as fuel, labor, and parts are on the increase.

Total income is still rising and will hit all-time highs in 1952—but operating incomes are showing very sharp drops so far this year. The gap between expenses and incomes began to narrow markedly during the fourth quarter of 1951. Approval by the CAB early this month of a $1-per-ticket charge will remedy part of the trouble, but such a charge is more of a "gimmick" than anything else and does not tackle the fundamental per-mile pricing policy of the entire industry.

The imponderable in the economic outlook is whether the airlines can continue to expand traffic to fill the additional seats and at the same time obtain the price for their product necessary to keep in the black and avoid subsidy. Adding more coach service is not the complete cure which some crusaders believe, since coach service must largely be restricted to major terminals and major routes, and consequently does not affect the bulk of the airline network. But more coach service is a certainty.

Air transport both here and abroad is being belabored to lower fares in order to tap a broader market, yet the same pricing philosophy is not applied to any other product or service. The railroads of the U. S. have just received their twelfth freight rate increase since the war. Airline fares are virtually at the 1939 level. The same individuals who berate the airlines for not lowering fares pay 50% to 100% more for food, clothing, automobiles, radios, and the like, without so much as a whimper. What is there about an airline seat that is so different from the economics of other industries and services?

The truth is that the airlines of the world have never been permitted by their governments to put aside enough money to pay a proper return on investment, or to price their product according to the economic standards applied to other industries and services. The CAB, for example, has virtually apologized for the modest airline net incomes for 1950 and 1951—but within the next 18 months the airlines must perform a heavy financing program and no one in either industry or government knows how it will be accomplished.

What is needed in the U. S. is a realistic and honest joint economic study by government and industry on airline finances for the next two years. To what extent is the drop in operating incomes due to available seat-miles, to increase costs, and to such setbacks as the New York airport situation? What will be required for airline financing this year and next? How can the fare structure be adjusted to benefit both trunk and short-haul services? Such a study needs to be performed immediately, for there are tangible signs of a genuine crisis ahead unless remedial steps are taken. The situation is not yet critical—but it is serious.

The airlines have other problems ahead, as well. The Newark Airport closing brought into focus many neglected phases of public affairs and the subsequent work of the airlines and the New York Port Authority has resulted in a healthy public relations approach never known before in the New York metropolitan area. The airlines are beginning to realize that attention needs to be given to airports; the entire subject has been long neglected.

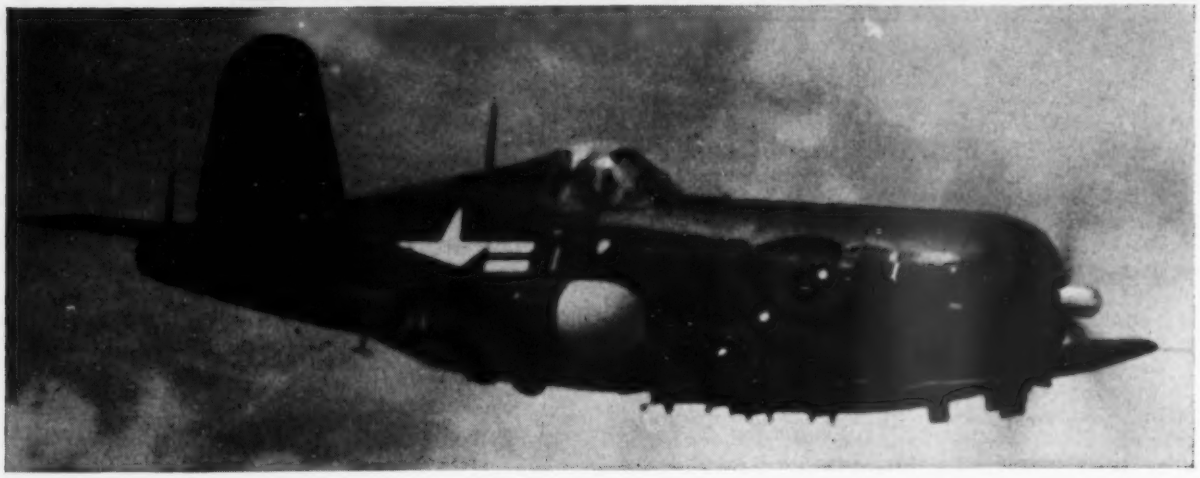
But a new and expanded sense of public relations is needed far beyond the airport problems. The industry is facing more serious financial times without having "sold" its achievements to the public. There is still a widespread belief that the scheduled airlines are highly subsidized, that they comprise an "entrenched interest" against the common good, and that they are inefficient. In the early years as a struggling industry, the airlines could count on volunteer civic crusaders to come to their aid from coast to coast. This isn't true today. The industry must face its neglected public relations problem soon or pay a far greater price in emergency defensive measures later on. The industry hasn't attained maturity as yet in either its public relations or public affairs approach. It has merchandised seats—but it hasn't learned to merchandise itself as a strong economic and industrial force.

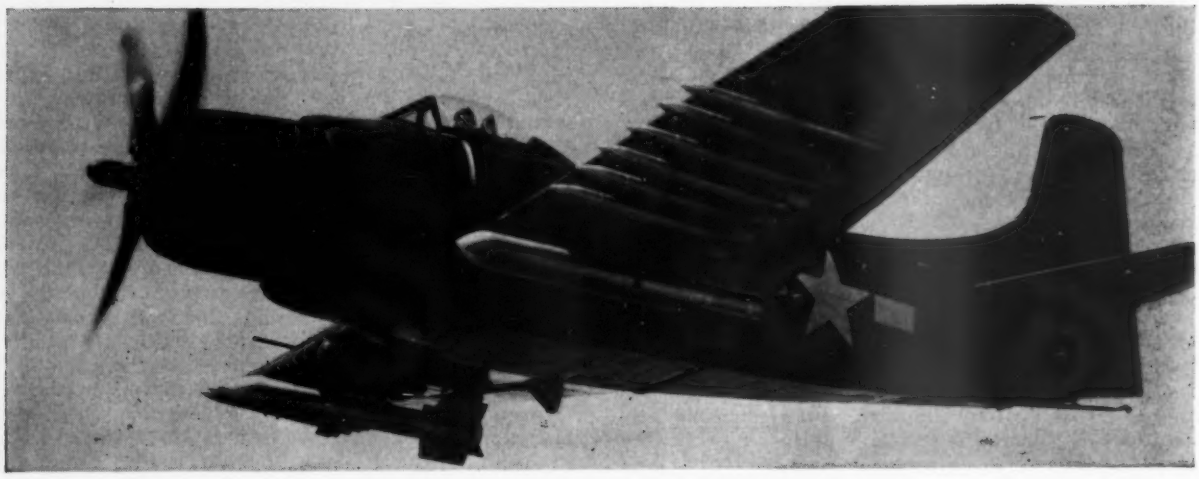
But these problems are characteristic of a lusty and growing industry. Air transport is one of very few enterprises in the world with a future virtually unlimited. Total traffic around the world has doubled in the past five years. More than 750,000 miles of routes are being served. This year marks the beginning of commercial jet transport service. Trans-Atlantic air coach broadens the traffic horizons materially. A common sense approach to economic problems by government regulatory agencies and the airlines themselves can keep the industry healthy and continually expanding.

Wayne W. Parrish

EDITOR AND PUBLISHER

B.F.Goodrich





De-Icers for fighters in Korea designed and tested in 21 days

ENGINEERS didn't think it could be done—fasten a De-Icer to the wing leading edge of *high-speed aircraft*. Okay on airliners and cargo ships and level-flying bombers. But in power dives and fast climbs of fighter combat, would De-Icers ever stay on? Wouldn't they foul up the planes' flight characteristics?

But after experience with icing conditions in Korea, the Navy decided they *had* to find a way to protect their fighter planes from ice. The plane manufacturers, the Navy and B. F. Goodrich put their heads together. For the Douglas Skyraider (bottom photo) design, production and first tests with a new kind of De-Icer took 32 days. For Chance Vought's Corsair (top photo) the time was 21 days. Net results of the tests: Even in high-speed dives, the new De-Icers came through without a sign of damage; there were no appreciable effects on flight characteristics.

The speed of these two installations and their successful performance resulted from the backlog of years of research and development with BFG pneumatic De-Icers. New cements were ready. The entire surface was cemented to the wing. There was also an extra screwed-on fairing strip for further reinforcement.

The new BFG De-Icers operate safely at 15 to 18 lbs. pressure. They are light in weight, yet tough and long-lasting. Take up little space for their plumbing. Are easily maintained. B. F. Goodrich engineers have the longest, most complete background of experience in the field of airplane ice protection. For help in your aircraft icing problems, write *The B. F. Goodrich Company, Aeronautical Division, Akron, Ohio.*

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	1951	1950	Per Cent Increase
Total operating revenues	$16,236,930	$12,885,044	26.0%
Net income after taxes (including special items of $267,983 in 1951 and $320,909 in 1950)	$ 1,130,959	$ 856,035	32.1%
Net income per share	$2.22	$1.68	32.1%
Dividends paid per share	$ .65	$ .50	30.0%
Capital at end of year	$ 4,893,645	$ 4,893,645	—
Earned surplus at end of year	$ 1,964,347	$ 1,164,450	68.7%
Number of shares outstanding	509,326	509,326	—
Book value per share	$13.46	$11.89	13.2%

PROPOSED INTERCHANGES

Providing through, one-plane service over the routes of

(1) C & S and Pan-American Airways between Chicago and Mexico City, with Houston as the interchange point.

(2) C & S and Trans World Airlines between Houston and New York, with St. Louis and Indianapolis as alternate interchange points.

SERVING A RAPIDLY GROWING AREA

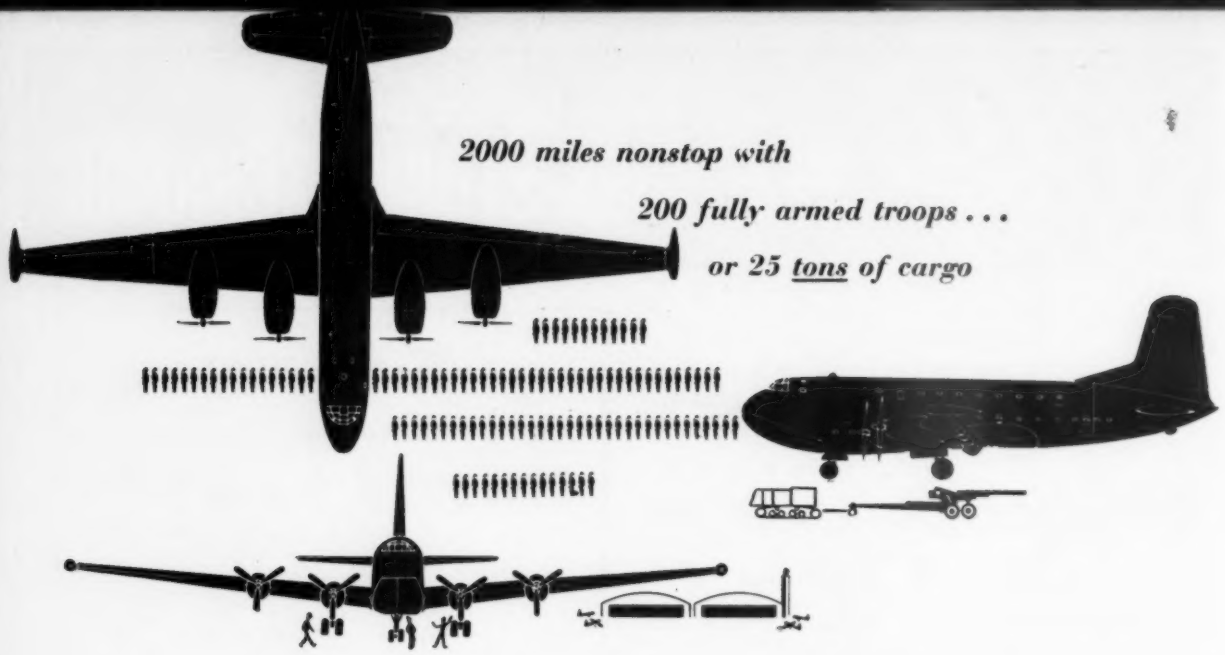
The growth of Chicago & Southern is a direct reflection of the rapid development of the territory it serves. C & S routes connect the teeming manufacturing centers of the Midwest with the booming industrial South and Gulf Coast. They link the oil and mining enterprises of Venezuela with the industrial centers of the U. S., and Chicago & Southern planes continue to carry more and more vacationists to the popular resort centers of Havana and Jamaica. In addition, C & S provides excellent connecting service to Rio de Janeiro, Sao Paulo and other South American points.



NOW AVAILABLE, Chicago & Southern Air Lines' 1951 Annual Report. Write C & S General Offices, Memphis 14, Tennessee.

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Performance of the C-124 Globemaster is another example of Douglas leadership in aviation. Building planes that can be mass-produced to fly *faster and farther with a bigger payload* is always the basic rule of Douglas design.



Depend on *DOUGLAS*  **First in Aviation**



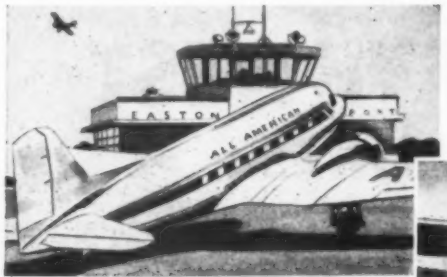
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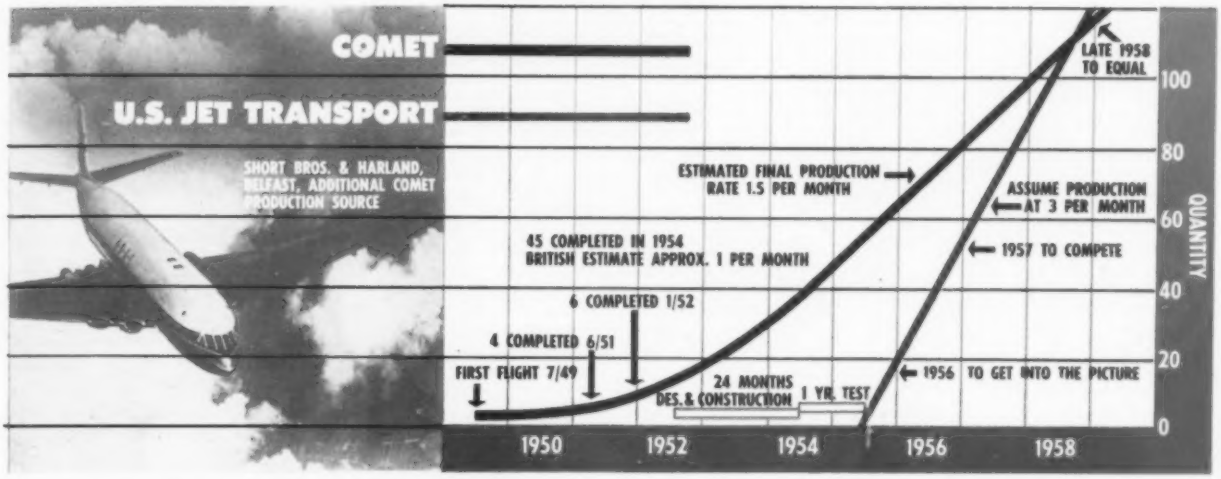
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BRITAIN'S LEAD in jet transport production, which the U. S. will not be able to eliminate until 1958, is expected to accelerate U. S. action in this field and shape the next major equipment program.

Billion Dollar Equipment Market—But No Jet

Postwar sales of U. S. transport manufacturers reach 1,200 mark but turbojet problem remains.

By William D. Perreault

THE AIRLINES of the United States, scheduled and non-scheduled, grossed more than a billion dollars in revenues in 1951. It was a spectacular performance made possible by an even more spectacular equipment program (see graph, page 19).

1,200 Sold Since War

Since the end of World War II, five U. S. transport manufacturers have sold the world's airlines more than 1,200 aircraft. Cash value of the nearly 900 transports delivered to the airlines during this period was over $640 million, including selected spare equipment. The 300-odd airline transports now in the process of production will swell the value of prime aircraft sales to over $1 billion.

Engines, propellers, aircraft and engine accessories, and related equipment put the grand total for commercial transport aircraft, engines, and equipment at more than $1½ billion.

The big question today is: Will the commercial transport and equipment program hold up?

Typical of the signs which prompt this question:

• **In the two-year period** ending in December, 1952, the scheduled U. S. airlines will have added more than 16 million seat-miles to their daily airlift capacity. This is a moderate estimate of increased capacity, based on actual plane block speeds, relatively low utilization of aircraft, and other modest assumptions. The total may reach 20 million daily seat-miles.

• **Last month** (American Aviation, April 14) the Departments of Defense and Commerce, recognizing the airline fleet of aircraft as essential to the country's defense effort, established a mobilization policy which will see 400 of the prime four-engine transports modified immediately for ultimate transfer to military operations within 48 hours of any all-out mobilization requirement.

In announcing the details of this mobilization plan, the Government noted that the airlines will still be able to carry their 1951 volume of traffic after these 400 planes are "drafted." This will require about a 25% increase in utilization, reallocation of the fleet, and similar drastic measures, but the fact remains that removal of 400 of its long-haul aircraft will not cripple the industry. This is the same industry which in pre-war years had a total of only 359 aircraft and all but 3 of these were twin-engine planes.

There are other signs and developments, above and beyond normal airline growth, that show promise of a continuing demand for new aircraft. These developments include such factors as the introduction of international coach fares, growing requirements for U. S.-built jet transports, and the continuing and expanding requirements for a local-service airline aircraft.

80% U.S. Market

Today 80% of the aircraft in scheduled airline use throughout the world are of United States manufacture. This saturation has been made possible by the engineering genius of U. S. manufacturers, spurred on by U. S. airline operators who have demanded safer, bigger, faster, and more luxurious aircraft operating at low plane-mile costs. Once engineered into the aircraft, these characteristics have opened a world-wide market of sufficient size to utilize U. S. production know-how in an

Postwar Transport Deliveries

BY MANUFACTURER AND TYPE

Year	Douglas					Lockheed		Boeing	Convair		Martin			Total
	DC-3	DC-4	DC-6	DC-6A	DC-6B	749	1049	377	240	340	202	202A	404	
1945	..	..	..	..	..	10	..	..	..	..	..	..	..	10
1946	28	66	6	..	..	57	..	..	..	..	..	..	..	157
1947	..	13	93	..	..	55	..	..	..	..	11	..	..	172
1948	..	..	49	..	..	18	..	..	109	..	20	..	..	196
1949	..	..	4	..	..	10	..	56	44	..	..	..	..	114
1950	3	1	17	..	..	36	..	..	21	..	..	12	..	90
1951	..	..	8	3	27	20	4	..	..	..	..	..	16	78
1952 (to date)	..	..	..	..	25	..	13	..	..	2	..	..	29	69
Total	31	80	177	3	52	206	17	56	174	2	31	12	45	886
To be delivered														
1952	..	..	..	..	42	..	6	..	..	50	..	..	54	152
1953	..	..	..	..	52	..	44	..	..	81	..	..	..	177
Total	..	..	..	..	94	..	50	..	..	131	..	..	54	329

industry which elsewhere uses relatively primitive methods.

Virtually all the postwar U. S. transports can be operated with break-even load factors of 50% or lower. This means that a 40-passenger ship can earn money with 21 passengers or a 60-passenger plane with 31. These past few years have been prosperous years measured in terms of traffic loads. Passenger and over-all load factors have often been above the traditional 70% high-water-mark of good service. This range between break-even load factors and actual loads spells profits.

Jet Dilemma

It also presents U. S. airlines and manufacturers with a dilemma.

Aviation owes its place in the transport market to speed. Turbine transports now being introduced into airline service abroad offer appreciably higher speeds than our present commercial aircraft. Yet there has been little incentive in the U. S. to build or buy a turbine-powered transport. This was best expressed by Peter Masefield, chief executive officer of British European Airways, after a recent tour of the U. S.:

"No jets are likely to operate [in the U. S.] for four or five years, unless some 'unsporting type' puts a British jet 'cat' among the American piston 'pigeons' internally. That would upset the whole, comfortably profitable, domestic picture."

No one is ignoring the jet transport. Pan American, American, United, National and others have spent much time and money studying available transports and proposed designs, here and abroad. Lockheed Aircraft Corp. is reliably reported to have spent one-half million dollars in jet transport design studies. Douglas and Boeing have also submitted costly design studies to the major airlines.

It is the jet transport and the local-service airline aircraft that must and will keep the U. S. transport market an active one. The earlier and unsuccessful attempt to get U. S. government support for prototype jet transport design and construction is now looked on as an unfortunate incident. The industry is convinced it can and will handle its own prototype construction. This is not a universal sentiment but it is predominant.

One of the biggest factors in this attempt to get Government support was the legitimate claim of the manufacturers that they had lost money on post-war transport production. This "loss" grew out of a temporary dip in airline traffic and finances in 1947-48 when production on new designs had just passed the 100 plane-per-type mark.

Since then the "loss" has been turned into a substantial profit. Commercial sales of these same basic designs have more than doubled the break-even point and are still being made. Military sales of these transports have further added to the profits. The commercial transport market has proved a most profitable one.

U. S. manufacturers will not let this profitable market, which has established them in their present position of world prominence, go to waste. If military orders were less pressing it is safe to say there would be a U. S.-built jet transport flying today.

One of the top commercial transport manufacturers has stated it will build a jet transport with its own money when it finds an airline actively interested in its design. This is probably true of both Douglas and Lockheed. It has been estimated that it will cost $30 million to produce a U. S. jet transport prototype. An order for 30 aircraft, meaning between $75 and $90 million, will probably get things rolling. This number of aircraft would not assure profitable manufacture but would make it a good business proposition on the basis of other orders which might be expected to follow.

Comet Leads Way

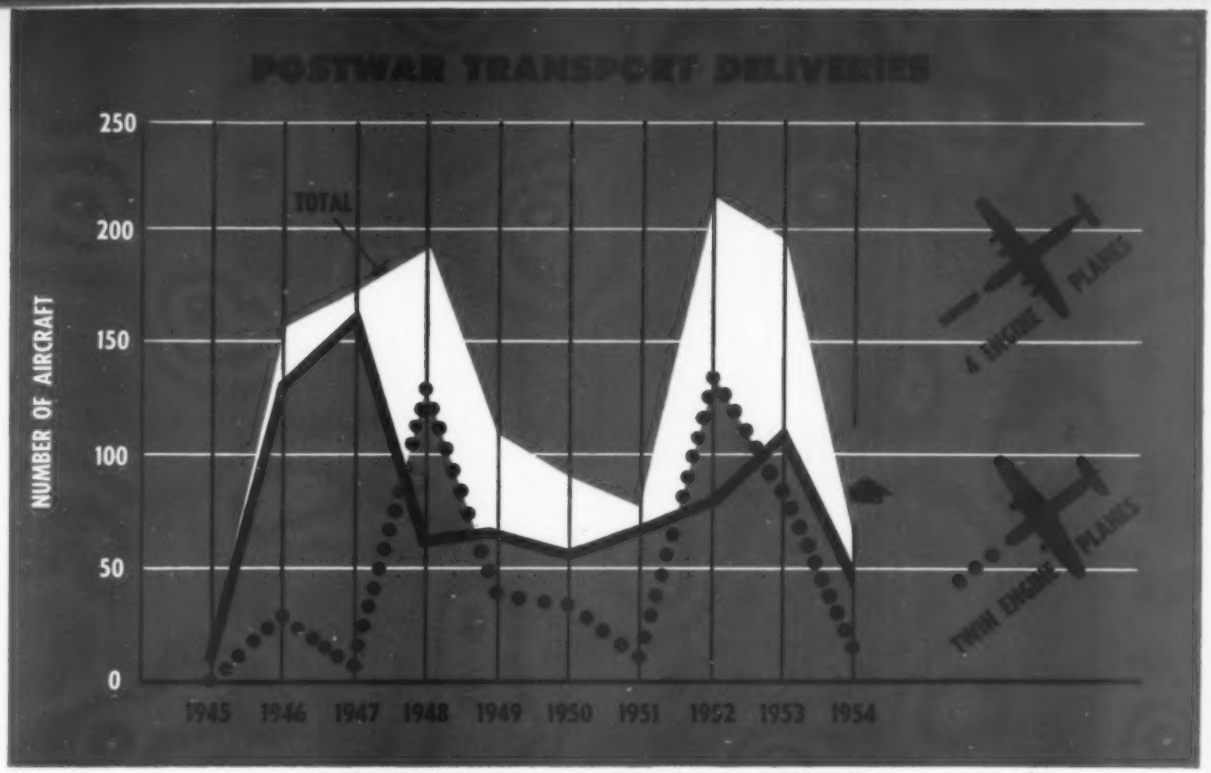
On May 2 British Overseas Airways Corp. will start flying the de Havilland Comet between London and Johannesburg, Africa, on scheduled flights. Within a year, Comet performance justifying, the Comet will fly the dollar-earning routes between the U. S. East Coast and the Bahamas, and later the lucrative North Atlantic runs.

The timing is already critical. It takes years to design, test, and mass-produce aircraft. How many years is a controversial subject. Informed estimates range from three to seven years. One of the country's most informed jet transport authorities indicates it will take until late 1958 for U. S. manufacturers to overtake British production even if work is started today (see chart). This assumes that the international situation does not worsen and that no serious bugs develop in either the Comet or U. S. design.

One factor which may shorten this estimate is the current status of jet transport design work. At least one of the three major contenders could start work on prototype construction almost immediately, its design studies being that far along today. Another major element is the premium placed on production speed. If production is considered of sufficient import, considerable production activity may coincide with prototype construction and testing.

Already Obsolete?

It has been suggested that the U. S. operators place too much emphasis on the fact that the Comet is "obsolete" today. U. S. proposals are for bigger, faster aircraft with more earning potential. But the Comet is an infant. The British have not overlooked the "stretching" process which made U. S. transports what they are today. The Comet is well suited to stretching, having a very low wing loading. More powerful engines, elongated fuselage and similar



MORE THAN 900 postwar transports have been delivered to the airlines by five U. S. manufacturers; more than 300 others are on order. Schedules for 1954 are actually off to a good start, despite the apparent drop in the graph; since a number of still-unannounced firm orders are not represented here. Arrow (▲) indicates upward trend.

measures may make it a formidable threat to U. S. designs.

The local-service airlines will become major transport aircraft purchasers. This point is not self-evident. Each of the manufacturers has looked at, invested money in, and virtually dropped this group as potential aircraft purchasers. This has been largely due to performance and economic requirements measured against today's powerplant capabilities and the projected market for a local-service airline aircraft.

It was 1939 before the scheduled domestic airlines carried as many passengers as did the local-service airlines in 1951. These are the lines which ordered more than 1,000 aircraft in the years since World War II. The growth record of the local-service airlines in their lives to date has generally been better than that of the domestic trunk lines in their early years, in large part due to the place won for aviation travel by the older lines.

There is ample reason to believe that the local-service airlines will maintain this growth trend. They already need new aircraft. At year's end, not a single new transport type aircraft had been ordered by these lines. Only last month Pioneer Air Lines ordered five Convair Liners and bought up nine postwar Martin 2-0-2's. Otherwise the equipment of the feeders consists of more than 100 Douglas DC-3's, a 15-18-year-old design, uneconomic but still the best available.

It was at the local-service lines' present level of traffic, about 125,000 passengers per month, that the domestic trunk lines tripled their operation in three years' time. A proportionately small show of growth would eliminate the biggest problem facing the local-service lines, namely, that the plane designs proposed so far are too big for the job and that smaller planes are not economically sound.

Improved Power

The turboprop engine or the compounded piston engine may introduce the power package needed to make a local-service airline aircraft a sound venture in the next few years. Engine manufacturers have started each cycle of aircraft improvement with improved powerplants. The Douglas DC-4's growth followed improvements in the Pratt & Whitney R-2000 engine; development of the various DC-6's, like the Convair Liners and Martin 4-0-4, paralleled improvements in the P&W R-2800 engine. Lockheed Constellation advances are patterned around Wright Aeronautical's R-3350 engine improvements. The Super Constellation and Douglas DC-7, technically impossible a few years ago, are the aircraft manufacturer's answer to the power potential of the Wright Turbo Compound engine.

These two factors, improved power packages and growing local-service traffic, will prompt the introduction of an aircraft design tailored to short-haul operations. This plane will cost more than a comparable aircraft has ever cost, but will have earning potential which will justify the initial investment.

The accompanying chart showing transport deliveries in the post-war period shows a sharp drop in 1954. The broad upward-pointing arrow represents the logical level as being appreciably above today's firm orders. Orders covering this period are just starting to accumulate.

Beyond this, the time when orders for present transport designs begin to slacken will be postponed by the impetus of coach travel on aviation's share in the total travel market. The normal growth pattern of domestic trunk and international travel and technological improvements will further revitalize the market.

Transport Aircraft Delivery Schedule

Since release of the listings in this chart the Defense Production Administration has authorized construction of 82 new air carrier type aircraft during the 30 month period ending Sept. 1954. Fifty-four of the 82 are for domestic operators, 28 for foreign lines. These aircraft include 35 Douglas DC-6B's, five Lockheed L-1049B's, 29 Douglas DC-7's, two Lockheed 1049C's and eleven Convair 340's.

MANUFACTURER FACILITY	SERV-ICE	MODEL	AIR-FRAME WT.	AIR-FRAME NO.	ENGINE MODEL	ENGINE MFG.	PROPELLER MODEL	AIRPLANE CONTRACT MFG.	AIRPLANE CONTRACT NO.	AIR CARRIERS	1952 1st Quarter	1952 2nd Quarter	1952 3rd Quarter	1952 4th Quarter	1952 TOTAL	1953 1st Quarter	1953 2nd Quarter	1953 3rd Quarter	1953 4th Quarter	1953 TOTAL	1954 1st Quarter	1954 2nd Quarter	1954 TOTAL
DOUGLAS	CAB	DC-6A	40,850	4	R-2800-CB16	P&W	43E60	HS	51-47	American	..	..	..	..	..	..	3	2	..	5	..	..	..
	CAB	DC-6A	40,810	4	R-2800-CB16,17	P&W	43E60	HS	50-40	Slick	..	..	..	..	..	3	..	..	..	3	..	..	..
	CAB	DC-6A	41,000	4	R-2800-CB17	P&W	43E60	HS	51-42	Flying Tigers	..	..	..	..	..	..	1	3	3	7	..	..	..
	CAB	DC-6B	44,020	4	R-2800-CB16	P&W	43E60	HS	50-9	American	..	..	..	..	..	1	..	..	..	1	..	..	..
	CAB	DC-6B	44,170	4	R-2800-CB16	P&W	43E60	HS	51-46	American	..	..	..	..	..	2	3	..	..	5	..	..	..
	CAB	DC-6B	44,070	4	R-2800-CB16	P&W	43E60	HS	50-34	Pan American Grace	2	..	..	..	2	..	..	..	..	..	..	..	..
	CAB	DC-6B	45,370	4	R-2800-CB17	P&W	43E60	HS	50-30	Pan American World	8	6	3	..	17	..	..	1	..	1	..	..	..
	CAB	DC-6B	44,010	4	R-2800-CB16	P&W	43E60	HS	51-48	United	..	..	..	..	..	..	..	2	..	2	..	..	..
	CAB	DC-6B	43,860	4	R-2800-CB16	P&W	43E60	HS	50-3	United	9	1	1	..	11	..	..	..	..	..	..	..	..
	CAB	DC-6B	44,170	4	R-2800-CB16	P&W	43E60	HS	50-6	National	..	..	4	2	6	..	..	..	..	..	..	..	..
	CAB	DC-6B	44,170	4	R-2800-CB16	P&W	43E60	HS	51-31	National	..	..	..	2	2	..	..	..	..	..	..	..	..
	CAB	DC-6B	43,770	4	R-2800-CB16	P&W	43E60	HS	51-10	Western	..	..	1	4	5	..	..	..	..	..	..	..	..
	CAB	DC-6B	44,170	4	R-2800-CB16	P&W	43E60	HS	51-40	Continental	..	..	..	..	..	..	2	..	..	2	..	..	..
	CAB	DC-6B	42,270	4	R-2800-CB16	P&W	43E60	HS	52-1-D	Delta	..	..	..	..	..	..	..	1	3	4	..	..	..
TOTAL DOUGLAS CAB											19	7	9	8	43	6	9	9	6	30	..	..	..
	ECA	DC-6A	40,470	4	R-2800-CB17	P&W	43E60	HS	51-51	KLM	..	..	..	..	..	..	..	1	..	1	..	..	..
	ECA	DC-6B	45,240	4	R-2800-CA15	P&W	43E60	HS	50-50	SAS	1	1	..	..	2	..	..	1	..	1	..	..	..
	ECA	DC-6B	45,470	4	R-2800-CB17	P&W	43E60	HS	50-57	SAS	..	..	1	5	6	..	..	..	..	..	..	..	..
	ECA	DC-6B	44,170	4	R-2800-CB17	P&W	43E60	HS	50-25	Swiss Air	..	..	1	..	1	..	..	..	..	..	..	..	..
	ECA	DC-6B	45,800	4	R-2800-CB17	P&W	43E60	HS	51-50	Swiss Air	..	..	..	..	..	..	..	..	3	3	..	..	..
	ECA	DC-6B	45,670	4	R-2800-CB17	P&W	43E60	HS	50-36	KLM	1	6	..	..	7	..	..	..	..	..	..	..	..
	ECA	DC-6B	45,670	4	R-2800-CB17	P&W	43E60	HS	51-23	Sabena	..	..	..	..	..	4	2	..	..	6	..	..	..
	ECA	DC-6B	45,510	4	R-2800-CB17	P&W	43E60	HS	51-24	T. A. I. French	..	..	..	..	..	..	3	..	..	3	..	..	..
	ECA	DC-6B	45,290	4	R-2800-CB17	P&W	43E60	HS	50-56	PAL	..	2	..	..	2	..	..	..	..	..	..	..	..
	ECA	DC-6B	45,670	4	R-2800-CB17	P&W	43E60	HS	51-60	Alitalia	..	..	..	..	..	..	..	4	..	4	..	..	..
	(1)	DC-6B	43,670	4	R-2800-CB17	P&W	43E60	HS	51-29	CPA	..	..	..	3	3	..	..	..	..	..	..	..	..
TOTAL DOUGLAS ECA											2	9	2	8	21	4	5	6	3	18	..	..	..
	OIT	DC-6B	44,920	4	R-2800-CB17	P&W	43E60	HS	50-48	Arabian Amer. Oil	..	1	1	..	2	..	..	..	..	..	..	..	..
	OIT	DC-6B	42,270	4	R-2800-CB16	P&W	43E60	HS	51-25	C. M. A. (Mexico)	..	..	..	..	..	..	1	2	..	3	..	..	..
TOTAL DOUGLAS OIT												1	1	..	2	..	1	2	..	3	..	..	..
GRAND TOTAL DOUGLAS FIRM ORDERS											21	17	12	16	66	10	15	17	9	51	..	..	..
LOCKHEED	CAB	1049	49,500	4	956-C18CA-1	WR	48E60-7	HS	LD-76A	Eastern Air Lines	9	..	..	..	9	..	..	..	..	..	..	..	..
	CAB	1049	50,100	4	975-C18CB-1	WR	43E60-7	HS	LD-75	Trans World Airlines	..	10	..	..	10	..	..	..	..	..	..	..	..
	CAB	1049C	48,600	4	972-TCDA-1	WR	43E60-7	HS	LX-89	Eastern Air Lines	..	..	..	..	..	..	..	7	4	11	..	..	..
TOTAL LOCKHEED CAB											9	10	..	..	19	..	..	7	4	11	..	..	..
	ECA	1049C	49,000	4	972-TCDA-1	WR	43E60-7	HS	LX-87	Air France	..	..	..	..	..	2	7	1	..	10	..	..	..
	ECA	1049C	49,300	4	972-TCDA-1	WR	C634S-C404	CW	LX-82	KLM	..	..	..	..	..	7	2	..	..	9	..	..	..
	(1)	1049C	48,900	4	972-TCDA-1	WR	43E60-7	HS	LX-90	Trans Canada	..	..	..	..	..	..	..	..	5	5	..	..	..
TOTAL LOCKHEED ECA																9	9	1	5	24			

Transport Aircraft Delivery Schedule

MANUFACTURER FACILITY	SERV-ICE	MODEL	AIR-FRAME WT.	NO.	ENGINE MODEL	MFG.	PROPELLER MODEL	AIRPLANE CONTRACT MFG.	NO.	AIR CARRIERS	1952 1st Quarter	1952 2nd Quarter	1952 3rd Quarter	1952 4th Quarter	1953 1st Quarter	1953 2nd Quarter	1953 3rd Quarter	1953 4th Quarter	1953 TOTAL	1954 1st Quarter	1954 2nd Quarter	1954 TOTAL
	OIT	1049C	49,300	4	972-TCDA-1	WR	C634S-C404	CW	LX-88	Pak Air Ltd.	..	..	..	..	..	..	1	2	3	..	..	..
	OIT	1049C	49,300	4	972-TCDA-1	P&W	C634S-C404	CW	LX-91	Quantas	..	..	..	..	..	..	..	1	1	..	..	..
TOTAL LOCKHEED OIT											..	..	..	..	..	..	1	3	4	..	..	..
GRAND TOTAL LOCKHEED FIRM ORDERS											9	10	..	..	19	9	9	9	12	39	..	..	..
MARTIN	CAB	404	18,801	2	R-2800-CB3	P&W	43E60-7	HS	1117	EAL	15	11	5	20	51	..	..	..	..	..	..	..
	CAB	404	18,685	2	R-2800-CB16	P&W	43E60-7	HS	1116	TWA	3	12	17	..	32	..	..	..	..	..	..	..
GRAND TOTAL MARTIN FIRM ORDERS											18	23	22	20	83	..	..	..	..	..	..	..
CONVAIR	CAB	340	22,200	2	R-2800-CB16	P&W	43-E60-7	HS	340-41	Northeast	..	..	..	..	..	1	2	..	..	3	..	..
	CAB	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-31	United	1	6	11	9	27	3	7	3	..	13	..	..
	CAB	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-32	Braniff	..	1	4	6	11	6	3	..	..	9	..	..
	CAB	340	22,200	2	R-2800-CB3	P&W	43E60-7	HS	340-36	Hawaiian	..	..	1	3	4	1	1	..	..	2	..	..
	CAB	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-35	Continental	..	..	1	1	2	4	1	..	..	5	..	..
	CAB	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-38	Delta	..	..	..	3	3	3	3	1	..	7	..	..
	CAB	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-39	Mid-Continent	..	..	..	..	..	1	4	1	..	6	..	..
	CAB	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-47	National	..	..	..	..	..	..	..	1	5	6	..	..
	CAB	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-46	Chicago & Southern	..	..	..	..	..	..	1	5	2	8	2	..
TOTAL CONVAIR CAB											1	7	17	22	47	19	22	11	7	59	2	..
	ECA	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-42	PAL	..	..	..	..	..	2	1	1	..	4	..	..
	ECA	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-48	KLM	..	..	..	..	..	..	..	2	4	6	..	..
	ECA	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-48	Garuda	..	..	..	..	..	..	..	3	4	7	1	..
TOTAL CONVAIR ECA											..	..	..	..	..	2	1	6	8	17	1	..
	OIT	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-33	Arabian Amer. Oil	..	..	2	..	2	..	..	..	..	..	..	..
	OIT	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-30	Aero A. Y. (French)	..	..	..	1	1	1	1	..	..	2	..	..
TOTAL CONVAIR OIT											..	..	2	1	3	1	1	..	..	2	..	..
	CAA	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-34	Texas Company	..	..	..	1	1	..	..	..	..	..	..	..
	CAA	340	22,200	2	R-2800-CB16	P&W	43E60-7	HS	340-37	Pratt & Whitney	..	..	..	1	1	..	..	..	..	..	..	..
TOTAL CONVAIR CAA											..	..	..	2	2	..	..	..	..	..	..	..
GRAND TOTAL CONVAIR FIRM ORDERS											1	7	19	25	52	22	24	17	15	78	3	..
TOTAL SIKORSKY	CAB	5-55	3439	1	R-1340-5343	P&W	Rotor	..	.....	Los Angeles Airways	2	..	..	..	2	..	..	..	..	..	..	..
GRAND TOTAL FIRM ORDERS—ALL MANUFACTURERS											51	57	53	61	222	41	48	43	36	168	3	..
Anticipated Orders							Convair				..	..	..	..	..	..	..	..	1	1	15	18
							Douglas				..	..	..	..	..	..	5	16	26	47	31	32
							Lockheed				..	..	..	..	..	..	..	..	5	5	9	9
							Martin				..	..	..	..	..	4	16	18	18	56	18	18
Total Anticipated Orders											..	..	..	..	..	4	21	34	50	109	73	77
GRAND TOTAL FIRM AND ANTICIPATED ORDERS											51	57	53	61	222	45	69	77	86	277	76	77

1954 TOTAL
..
..
..
..
..
..
..
..
33
63
18
36
150
153

* *Non-Carrier Aircraft Included in this Schedule for Convenience in Handling*

(1) Canadian Division of NPA

Source: American Aviation Survey

Transport Engine Delivery Schedule[1]

Manufacturer and Model Firm Airframe Orders	1952													1953											
	1st Quarter			2nd Quarter			3rd Quarter			4th Quarter				1st Quarter			2nd Quarter			3rd Quarter			4th Quarter		
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Total
Douglas Aircraft																									
Pratt & Whitney R2800-CB16																									
Installation	..	..	4	4	8	12	16	4	12	4	8	8	80	8	12	16	8	12	8	4	8	..	..	..	..	76
Concurrent Spares	..	..	2	2	4	6	8	2	6	2	4	4	40	4	6	8	4	6	4	2	4	..	..	..	..	38
Martin Aircraft																									
Pratt & Whitney R2800-CB16																									
Installation	..	8	16	12	16	6	..	..	..	..	..	..	58	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Concurrent Spares	..	4	8	6	8	3	..	..	..	..	..	..	29	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Convair Aircraft																									
Pratt & Whitney R2800-CB16																									
Installation	2	6	6	12	12	14	14	14	14	16	12	14	136	16	10	16	16	12	12	12	12	10	4	2	..	122
Concurrent Spares	1	3	3	6	6	7	7	7	7	8	6	7	68	8	5	8	8	6	6	6	6	5	2	1	..	61
Total All Aircraft																									
Pratt & Whitney R2800-CB16																									
Installation	2	14	26	28	36	32	30	18	26	20	20	22	274	24	22	32	24	24	20	16	20	10	4	2	..	198
Concurrent Spares	1	7	13	14	18	16	15	9	13	10	10	11	137	12	11	16	12	12	10	8	10	5	2	1	..	99
Total Pratt & Whitney 12800-CB16 Requirements	3	21	39	42	54	48	45	27	39	30	30	33	411	36	33	48	36	36	30	24	30	15	6	3	..	297
Douglas Aircraft																									
Pratt & Whitney 12800-CB17																									
Installation	16	24	20	16	4	8	12	12	8	..	12	16	148	12	4	8[3]	12	12	12	8	8	8	..	..	..	84
Concurrent Spares	8	12	10	8	2	4	6	6	4	..	6	8	74	6	2	4	6	6	6	4	4	4	..	..	..	42
Total Pratt & Whitney R2800-CB17 Requirements	24	36	30	24	6	12	18	18	12	..	18	24	222	18	6	12	18	18	18	12	12	12	..	..	..	126
Douglas Aircraft																									
Pratt & Whitney R2800-CA15																									
Installation	4	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Concurrent Spares	2	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Total Pratt & Whitney R2800-CA15 Requirements	6	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Martin Aircraft																									
Pratt & Whitney R2800-CB3																									
Installation	14	8	..	..	..	10	16	16	8	..	..	..	72	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Concurrent Spares	7	4	..	..	..	5	8	8	4	..	..	..	36	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Convair Aircraft																									
Pratt & Whitney R2800-CB3																									
Installation	..	..	..	..	..	2	2	2	2	..	..	2	10	2	..	..	..	..	..	..	..	..	..	..	..	..	2
Concurrent Spares	..	..	..	..	..	1	1	1	1	..	..	1	5	1	..	..	..	..	..	..	..	..	..	..	..	..	1
Total All Aircraft																									
Pratt & Whitney R2800-CB3																									
Installation	14	8	..	..	..	12	18	18	10	..	..	2	82	2	..	..	..	..	..	..	..	..	..	..	..	..	2
Concurrent Spares	7	4	..	..	..	6	9	9	5	..	..	1	41	1	..	..	..	..	..	..	..	..	..	..	..	..	1
Total Pratt & Whitney R2800-CB3 Requirements	21	12	..	..	..	18	27	27	15	..	..	3	123	3	..	..	..	..	..	..	..	..	..	..	..	..	3
R2800 Requirements (All Aircraft)																									
Installation	36	46	46	44	40	52	60	48	44	20	32	40	508	38	23	40	36	36	32	24	28	18	4	2	..	284
Concurrent Spares	18	23	23	22	20	26	30	24	22	10	16	20	254	19	13	20	18	18	16	12	14	9	2	1	..	142
Total Requirements for Pratt & Whitney Engines	54	69	69	66	60	78	90	72	66	30	48	60	762	57	39	60	54	54	48	36	42	27	6	3	..	426
Lockheed Aircraft																									
Curtiss-Wright 972TCDA1																									
Installation	..	..	..	..	..	..	..	..	..	8	8	20	36	16	12	8	8	8	20	36	34	8	..	..	..	150
Concurrent Spares	..	..	..	..	..	..	..	..	..	4	4	10	18	8	6	4	4	4	10	18	12	4	..	..	..	70
Total Curtiss-Wright 972TCDA1 Requirements	..	..	..	..	..	..	..	..	..	12	12	30	54	24	18	12	12	12	30	54	46	12	..	..	..	220
Lockheed Aircraft																									
Curtiss-Wright 975C18CB-1																									
Installation	12	8	20	..	..	..	..	..	..	..	..	..	40	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Concurrent Spares	6	4	10	..	..	..	..	..	..	..	..	..	20	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Total Curtiss-Wright 975C18CB-1 Requirements	18	12	30	..	..	..	..	..	..	..	..	..	60	..	..	..	..	..	..	..	..	..	..	..	..	..	...
Curtiss-Wright Requirements (All Aircraft)																									
Installation	12	8	20	..	..	..	..	..	..	8	8	20	76	16	12	8	8	8	20	36	24	8	..	..	..	140
Concurrent Spares	6	4	10	..	..	..	..	..	..	4	4	10	38	8	6	4	4	4	10	18	12	4	..	..	..	70
Total Requirements for Curtiss-Wright Engines	18	12	30	..	..	..	..	..	..	12	12	30	114	24	18	12	12	12	30	54	36	12	..	..	..	210
Total Engine Requirements C-5 Program																									
Installation	48	54	66	44	40	52	60	48	44	28	40	60	584	54	38	48	44	44	52	60	52	26	4	2	..	424
Concurrent Spares[2]	24	27	33	22	20	26	30	24	22	14	20	30	292	27	19	24	22	22	26	30	26	13	2	1	..	212
Total Firm C-5 Engine Requirements[3]	72	81	99	66	60	78	90	72	66	42	60	90	876	81	57	72	66	66	78	90	78	39	6	3	..	636

[1] *Engine Delivery Dates Based Upon Airplane Dates (Contained in Foreign and Domestic Civil Carrier Aircraft C-5 Schedule) Minus 90 day Lead Time*
[2] *Concurrent Spares Based Upon 50% of Installation Requirements*
[3] *Based Upon Firm Airframe Orders*
Prepared by: Aircraft Claimant Staff, Office of Aviation Defense Requirements
(9-13-51) Civil Aeronautics Administration

Civil Air Carriers Gear for Military Role

Gain official recognition of value to national defense for providing needed airlift.

By Eric Bramley

AFTER MORE than three years' work, a plan has been worked out which accords to U. S. air carriers the official recognition they have long sought as a vital part of the national defense.

The plan, known as the Civil Reserve Air Fleet Plan, is a blueprint of what happens if the U. S. is involved in an all-out military emergency.

It recognizes that military air transport alone would be unable to handle the loads that would have to be moved. Commercial operators will therefore be called upon to furnish 400 four-engined aircraft, most of them (358) coming from the scheduled airlines.

Of great importance is the fact that the plan provides for the operation of these planes, under contract, by airline crews. Maintenance, overhaul, etc., will also be performed by civil operators.

Only in event of great emergency, and then only by the "highest authority," will the civil fleet be militarized and their crews put into military uniforms.

Strong Fleet

The airlines also know where they stand concerning civil operations in wartime—the plan provides for a strong domestic and international air transport network operating under a priorities system with twin-engine and remaining four-engine aircraft.

Here is how the plan would be carried out:

The Department of the Air Force is the "action agency" for the Defense Department, maintaining continuing monitorship of the overall program. Within the AF, the Commander of Military Air Transport Service, currently Maj. Gen. Joseph Smith, is responsible for the actual implementation of the Civil Reserve Air Fleet Plan.

The Commerce Department, through its Defense Air Transportation Administration, will allocate civil planes to the military, and will insure that civil requirements are not overridden by the military. Current head of DATA is Ray W. Ireland, vice president-traffic administration of United Air Lines.

On the civil side, the Civil Aeronautics Board will decide what routes and frequencies will be operated.

The CAB Chairman will determine how remaining planes will be redistributed among the airlines for operation of these routes and frequencies.

An Air Priorities Board, through which the Secretaries of Defense and Commerce will exercise top authority and responsibility, will provide joint policy direction over all military and civil air transport. A Director of Air Priorities in the Secretary of Defense's office, will administer the priorities system subject to policy guidance of the Board.

To prepare for the possibility of war, the following steps are to be taken immediately:

331 four-engined commercial planes are to be modified at a cost of $10 million so that they will be available for military use, under contract, on 48 hours' notice. Modifications will include items needed for over-ocean flying. Eventually the entire four-engine fleet, including new production planes, will be modified. These modifications will be made by the carriers, with the Air Force paying the bill.

Plans are to be devised for overcoming a shortage of 1,000 civil navigators (out of 1,400 needed). Operators may cross-train their pilots as navigators, and locate and arrange for emergency employment of qualified navigators.

Modification Contracts

Contracts are to be negotiated with the Air Force covering modifications and services needed to implement the plan—plane operations, training, maintenance, etc.

Air carriers shall try to determine which of their personnel will be used for military support operations.

Routes and frequencies for civil operations are to be worked out. They will be revised yearly.

Redistribution of planes between carriers for civil operations is to be by lease arrangements, and CAB is urging the airlines to work out such contracts as soon as possible.

If an all-out emergency occurs, here is what will happen:

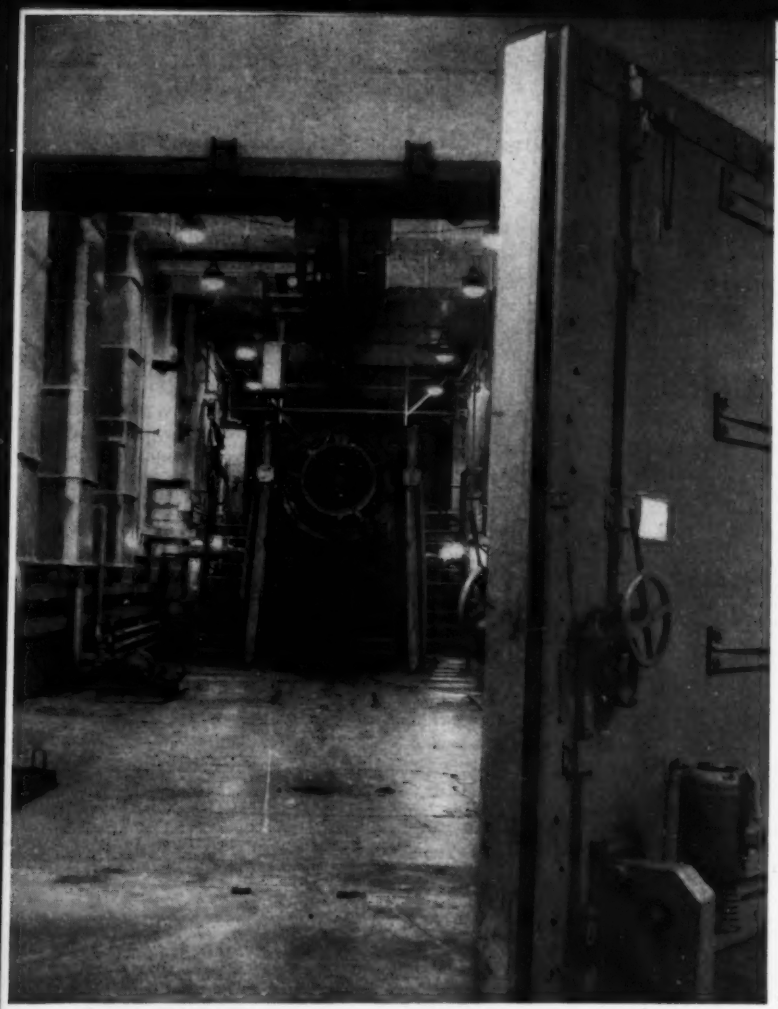
Minimum Crew Requirements

(MINIMUM 3.5 CREWS PER AIRCRAFT)

Carrier	L49	DC-6 Type	B-377	DC-4	Total
AAL	..	165	..	49	214
ALASKA	..	..	..	11	11
AVIA CAP	..	..	..	4	4
BNF	..	21	..	..	21
CAL CENT	..	..	..	4	4
CAL EAST	..	..	..	14	14
CAA	..	..	..	4	4
CAP	11	..	..	7	18
CHI	14	..	..	..	14
DAL	..	11	..	..	11
EAL	42	..	..	49	91
FLY TIG	..	..	..	11	11
FRONT	..	..	..	4	4
NAL	..	14	..	21	35
NWA	..	..	25	39	64
OAT	..	..	..	14	14
PAA	..	..	77	63	140
PAG	..	18	..	4	22
PAC NORTH	..	..	..	4	4
S & W	..	..	..	14	14
SLICK	..	11	..	..	11
TAL	..	..	..	35	35
TWA	133	..	..	46	179
UAL	..	109	21	77	207
U. S. O/S	..	..	..	4	4
WAL	..	..	..	18	18
TOTAL	200	349	123	496	1168*

*NOTES: * The arithmetically correct figure, based upon 331 aircraft x 3.5 crews, is 1158.5. The apparent discrepancy is due to the necessity of eliminating fractional crews in computing for each operator separately.*

In explaining the crew arrangements the CAFR report notes that the proposed modifications to the communications equipment on these civil aircraft should eliminate the necessity for a flight radio operator and "it is felt that the flight engineer is not necessary either on DC-4 or DC-6 aircraft although it is recognized that certain contractors include a flight engineer."



"Super-cells" in development area are capable of housing jets more powerful than any now in existence. Thirty-three new cells for production engines have also been added.



New office building is pivot-point of jet center. Functional construction and decor contribute to efficiency.



New machine grinds gears to tolerances of .0003 inches. Modern machinery like this speeds jet manufacture.



Test cell control room is "floated" on rubber cushions and suspended in air to insure instrument accuracy.

JET CENTER, U.S.A.

Nearly four million square feet of floor space, employment approaching 8000, and some of the most modern and complete jet-producing facilities in the world make up "Jet Center, U.S.A.," the new General Electric plant at Lockland, Ohio. Dedicated on the tenth anniversary of the first American jet engine, this new jet giant will be a tremendous factor in the future of American aviation.

Lockland provides for rapid expansion to meet national emergencies as well as a foundation for peace time production. While its recent rapid growth has been due mainly to the demands of increased aircraft production, Lockland will remain to spearhead the progress of aviation and to bulwark national security.

Features of the new plant are a new parts production building and a new engineering and administration building, both recently completed, and a new Components Development Center now under construction. One large building, previously used for assembly of production engines, is now devoted to development work to bridge the difficult gap between experiment and production. Two huge new test cells, with a common control room, have been built especially large to accommodate engines of extremely high thrust ratings.

During the fastest ten years in history, jet engines designed and developed by General Electric have powered more planes, set more records, and flown more hours than all other U.S. jets combined. Now, with this experience, a team of skilled workers and the new facilities available at Lockland, General Electric works for the future.

210-28

You can put your confidence in—

GENERAL ELECTRIC

Civil Air Fleet Tabbed for Military Service

Operator	FIRST LINE RESERVE				INITIAL SECOND LINE				PERMANENT SECOND LINE			
	Boeing	DC-6	Connie	DC-4	Boeing	DC-6	Connie	DC-4	Boeing	DC-6	Connie	DC-4
Alaska Airlines	..	..	..	1	..	..	..	2	..	..	..	2
American Airlines	..	4	..	..	..	43	..	14	..	36	..	14
Arabian-American Oil	..	..	..	..	..	..	..	..	..	..	..	2
Aviation Capital	..	..	..	1*	..	..	..	..	..	..	..	..
Braniff Airways	..	..	..	..	..	6	..	..	..	6	..	4
California Central	..	..	..	1	..	..	..	..	..	..	..	..
California Eastern	..	..	..	4	..	..	..	..	..	..	..	..
Capital Airlines	..	..	..	..	..	..	3	2	..	..	3	4
Chicago & Southern	..	..	..	..	..	..	4	..	..	..	4	..
CAA	..	..	..	1**	..	..	..	..	..	..	..	..
Delta Air Lines	..	..	..	..	..	3	..	..	..	3	..	6
Eastern Air Lines	..	..	3	..	..	..	9	14	..	..	9	14
Flying Tiger Line	..	..	..	3	..	..	..	..	..	..	..	..
Frontier Airlines	..	..	..	1	..	..	..	..	..	..	..	..
Kaman Aircraft	..	..	..	..	..	..	..	..	..	..	..	1
National Airlines	..	..	..	..	..	4	..	6	..	4	..	6
Northwest Airlines	..	..	..	..	7	..	..	11	7	..	..	12
Ocean Air Tradeways	..	..	..	4	..	..	..	..	..	..	..	..
Pacific Northern	..	..	..	1***	..	..	..	..	..	..	..	..
Pan American	12	..	..	8	10	..	..	10	10	..	..	28
Panagra	..	..	..	..	..	5	..	1	..	5	..	4
Resort Airlines	..	..	..	..	..	..	..	..	..	..	..	2
Salem Engineering	..	..	..	..	..	..	..	..	..	..	..	1
Seaboard & Western	..	..	..	4	..	..	..	..	..	..	..	..
Slick Airways	..	..	..	..	..	3	..	..	..	3	..	..
Transocean Air Lines	..	..	..	10	..	..	..	..	..	..	..	..
TWA	..	..	21	4	..	..	17	9	..	..	17	9
Twentieth Century	..	..	..	..	..	..	..	..	..	..	..	1
United Air Lines	..	7	..	..	6	24	..	22	6	20	..	22
U. S. Overseas	..	..	..	1	..	..	..	..	..	..	..	..
Waterman (TACA)	..	..	..	..	..	..	..	..	..	..	..	1
Western Air Lines	..	..	..	..	..	..	..	5	..	..	..	5
TOTAL	12	11	24	44	23	88	33	96	23	77	33	138

NOTE: Permanent Second Line is a revision of Initial Second Line and is not in addition thereto.

DATA officials state that a number of the above planes are no longer operated by the companies listed, and in other instances errors have crept into the listings. These errors will be corrected as airline and government meetings progress. Typical error is listing of Frontier Airlines as contributing a DC-4. Frontier operates only DC-3's.

** Probably to be operated by Pan American or Panagra.*

*** Probably to be operated by Seaboard & Western.*

**** This aircraft not capable of 2,500-mile range.*

The First Line Reserve Fleet (see table), consisting of 91 aircraft, will be called immediately and will be required continuously throughout the emergency. This fleet includes 44 DC-4's, 11 DC-6's, 24 Constellations and 12 Boeing Stratocruisers.

The Second Line Reserve Fleet, consisting initially of 240 planes and later of 271, will be used during critical periods, the actual number fluctuating with airlift requirements.

The carriers will be called upon to furnish a minimum of 3.5 crews per plane (see table), or a total of 1,168 crews. Flight crews are not to exceed 100 hours monthly (plus or minus 10 hours for latitude of scheduling) or a total of 300 hours in any one quarter. Airline mechanics and other ground employes will work a 48-hour week.

For civil operations, the CAB-determined War Aid Service Pattern will go into effect with planes as reallocated by the CAB chairman.

The priorities system for civil travel will be put into operation.

There will be no civil non-scheduled airline operations during wartime. After furnishing 35 four-engined planes to the military, the non-skeds' remaining twin-engine and four-engine fleet will be available to the military and to civilian defense either within or outside the U. S.

Share for Cargo

Certificated cargo lines will be allocated enough aircraft to preserve the "proportionate distribution of capacity between all-cargo and passenger carriers."

The overall D-Day training requirement "means only an expansion of training within the contractors' existing organizations," the Defense Dept. states.

The plan for wartime civil operations is to redistribute the remaining planes among the airlines on the basis of their most recent percentage participation in the air transport market. For planning purposes, the 12 months ended December 31, 1951, will be used.

CAB states that the airlines, after losing 358 planes to the military under contract, will still have more than enough capacity to handle 1951 traffic volume with standard seating arrangements, but with 10-hour daily use. This includes use of four-engine equipment on all schedules containing one hop of 650 miles or more.

The airlines, according to CAB, will have remaining 738 twin-engine and 238 four-engine planes, producing 67,716,132 seat-miles daily against a 1951 average of 35,888,827 passenger-miles. With high-density seating, there would be 91,249,943 daily seat-miles available.

1951 Record of Prime Contract Carriers, Outbound on Pacific Airlift

Airline	Passengers	Cargo & Mail Tons	Total Tons	Trips
United	16	1,945	1,945	307
Flying Tigers	5,220	1,383	2,010	435
Calif. Eastern	7,150	415	1,240	275
Northwest*	8,360	1,089	2,235	418
Overseas National	4,964	1,004	1,489	292
U. S. Overseas	440	151	200	40
Seaboard & Western	3,168	1,653	2,041	349
Transocean	2,000	1,840	2,121	400
Pan American*	18,238	1,990	3,980	829
Alaska	4,674	...	515	114
Totals	**54,238**	**11,470**	**17,649**	**3,459**

** Includes other carriers under contract.*

U. S. Flag Lines Dominate Pacific Airlift

With less than one-third of planes commercial carriers handle more than one-half of load.

By James J. Haggerty, Jr.

SHOULD any testimonial be required as to the value of the commercial airlines in an emergency, the Pacific airlift certainly supplies it.

With the lift now in its twenty-second month, the U. S. flag carriers can point with pride to these accomplishments:

- **They have carried** more than 67% of the passengers hauled to Japan and the Far East.
- **They have hauled** more than 56% of the outbound cargo carried.
- **They have carried** almost 70% of all mail lifted to the war theater.
- **They have flown** almost twice as many outbound trips as has Military Air Transport Service and about 60% of the total lift trips (including the Royal Canadian Air Force, Sabena and Canadian Pacific Air Lines).
- **Their combined tonnage** amounts to more than 61% of the total tonnage hauled to the war theater.

These accomplishments are all the more spectacular when it is considered that the commercial carriers employed an average of 60 planes in the lift against an average total of close to 200 planes. In other words, with fewer than one third of the airplanes, they have been handling well over half the work load.

It might be pointed out that this record is not an indication of inefficiency on the part of the other participants. It was built by MATS' design, for MATS, with far too few aircraft to handle its global commitments, such as the increased lift to Europe, decided to let the charter carriers carry the major portion of the Pacific lift work load.

At the end of February, the last month for which complete data are available, the U. S. commercial carriers had made 6,271 outbound lift trips, hauling 91,000 passengers, 14,000 tons of cargo, 6,000 ton of mail for a total of 31,000 outbound tons.

PAA Leads

Official MATS statistics place Pan American World Airways at the head of the list, with regard to tonnage carried. These figures need some qualification, however: Pan American is a prime contractor, but included in its tonnage totals are those flown by other airlines which are serving as subcontractors, among them American Airlines, Capital Airlines, Western Air Lines and Panagra. Northwest Airlines is in second place. Northwest has two subcontractors—Trans World Airlines and Delta Air Lines. Transocean Air Lines, operating without subcontract assistance, placed third. Again, these figures are not indicative of greater effort on the part of any one carrier.

The difference in tonnages was determined by the number of planes the carrier had in the lift, the type of plane and the number of trips assigned to the carrier by MATS. Most recent figures, for instance (March 28, 1952), show that Pan American is operating 21 planes, including six supplied by American and one by Capital. Northwest operates 12 planes, five from TWA and one from Delta. Transocean has seven. All commercial planes in the lift are now Douglas DC-4's.

12 Airlines in Lift

Latest figures show a total of 61 commercial planes in the lift, with 12 airlines, including subcontractors, participating. The airlines are Northwest, TWA, Delta, Seaboard & Western, Flying Tigers, Overseas National, Pan American, Capital, American, Transocean, United and California Eastern. In addition, MATS is operating 58

Pacific Airlift Totals, Outbound

U. S. Commercial

February Totals	To-Date Totals
3,485 passengers	91,874 passengers
537.4 tons cargo	14,170.5 tons cargo
514.8 tons mail	6,104.3 tons mail
1,380.2 total tons	31,050.2 total tons
291 trips	6,271 trips

MATS

February Totals	To-Date Totals
1,564 passengers	32,632 passengers
442.9 tons cargo	10,423.9 tons cargo
86.2 tons mail	2,218.4 tons mail
708.2 total tons	16,474.1 total tons
145 trips	3,247 trips

RCAF

February Totals	To-Date Totals
8 passengers	3,206 passengers
6.7 tons cargo	571.2 tons cargo
37.2 tons mail	149.8 tons mail
44.8 total tons	1,105.7 total tons
15 trips	355 trips

Sabena

February Totals	To-Date Totals
51 passengers	466 passengers
12.1 tons cargo	466.5 tons cargo
13.2 tons mail	350.4 tons mail
30.2 total tons	867.9 total tons
6 trips	165 trips

Canadian Pacific

February Totals	To-Date Totals
446 passengers	8,066 passengers
.....	.7 tons cargo
6.7 tons mail	7 tons mail
61.2 total tons	979.2 total tons
17 trips	288 trips

Totals Thru February, 1952

February Totals	To-Date Totals
5,554 passengers	136,244 passengers
991.1 tons cargo	25,632.8 tons cargo
559.1 tons mail	8,829.9 tons mail
2,224.6 total tons	50,447.1 total tons
474 trips	10,326 trips

Note: To-date totals include figures from July, 1950, through February, 1952.

of its own planes and the United Nations (Sabena, Canadian Pacific and the RCAF) are supplying 15 more. The Air Force's troop carrier units had been operating more than 60 planes in the lift, but they dropped out last September.

Three Routes

Lift planes still operate over three separate routes, to avoid saturating the facilities on any one route. Shortest route is the Great Circle course, from McChord AFB, Tacoma, Wash., to Anchorage, Alaska, then across the Aleutian chain to Tokyo, using Shemya in the Aleutians as a refueling stop. Distance on this route is 5,688 miles, flying time about 33 hours. The second route, the mid-Pacific route, entails stops at Honolulu, Johnston Island, Kwajalein and Guam en route to Tokyo. Distance, 8,083 miles; time, 45 hours. The third route involves only two stops, Honolulu and Wake Island. Distance is 6,772; flying time 38 hours. Average distance over the three routes is close to 7,000 miles.

The Pacific lift is now unquestionably the greatest airlift effort of all time. Its current average of less than 100 tons a day may not sound impressive by the standards of the great Berlin airlift, until it is considered that each ton carried to the East represents some 7,000 ton miles. As early as September of 1950 the Pacific lift topped the best effort of the Berlin airlift by 10,000 plane-miles a day. The lift effort fell off somewhat after September, 1950, as U.N. forces swept to what looked like a complete victory in Korea, but it picked up again after the intervention of the Chinese Communists, and since last spring the monthly lift totals have consistently been higher than that of September, 1950.

Heavy Supply Flow

It is interesting to note that, although truce negotiations in Korea appear to be drawing to a close, the United Nations are taking no chances and are continuing a heavy supply effort by air. In February, 1952, for instance, plane-miles flown were still higher than they were in the pre-Chinese-intervention peak.

Through the first 20 months of lift operations, the combined fleet of MATS, United Nations and U. S. commercial planes hauled well over 50,000 tons of passengers, mail and cargo to the war theater. This can be translated into about 350,000,000 ton miles. They made over 10,000 trips (outbound alone), carried more than 135,000 passengers and more than 25,000 tons of cargo.

Pacific Airlift Evacuations

Including battle and non-battle casualties as well as sick personnel

Month	Monthly Totals	Cumulative Totals	Month	Monthly Totals	Cumulative Totals
July 1950	535	535	May 1951	1,931	26,143
Aug. 1950	1,378	1,913	June 1951	2,603	28,746
Sept. 1950	3,244	5,157	July 1951	1,786	30,532
Oct. 1950	2,521	7,678	Aug. 1951	1,618	32,150
Nov. 1950	1,792	9,470	Sept. 1951	1,484	33,634
Dec. 1950	6,352	15,822	Oct. 1951	2,292	35,926
Jan. 1951	2,224	18,046	Nov. 1951	2,144	38,070
Feb. 1951	2,007	20,053	Dec. 1951	2,009	40,079
Mar. 1951	2,251	22,304	Jan. 1952	1,418	41,497
Apr. 1951	1,908	24,212	Feb. 1952	1,047	42,544

Contract Carrier Accomplishments

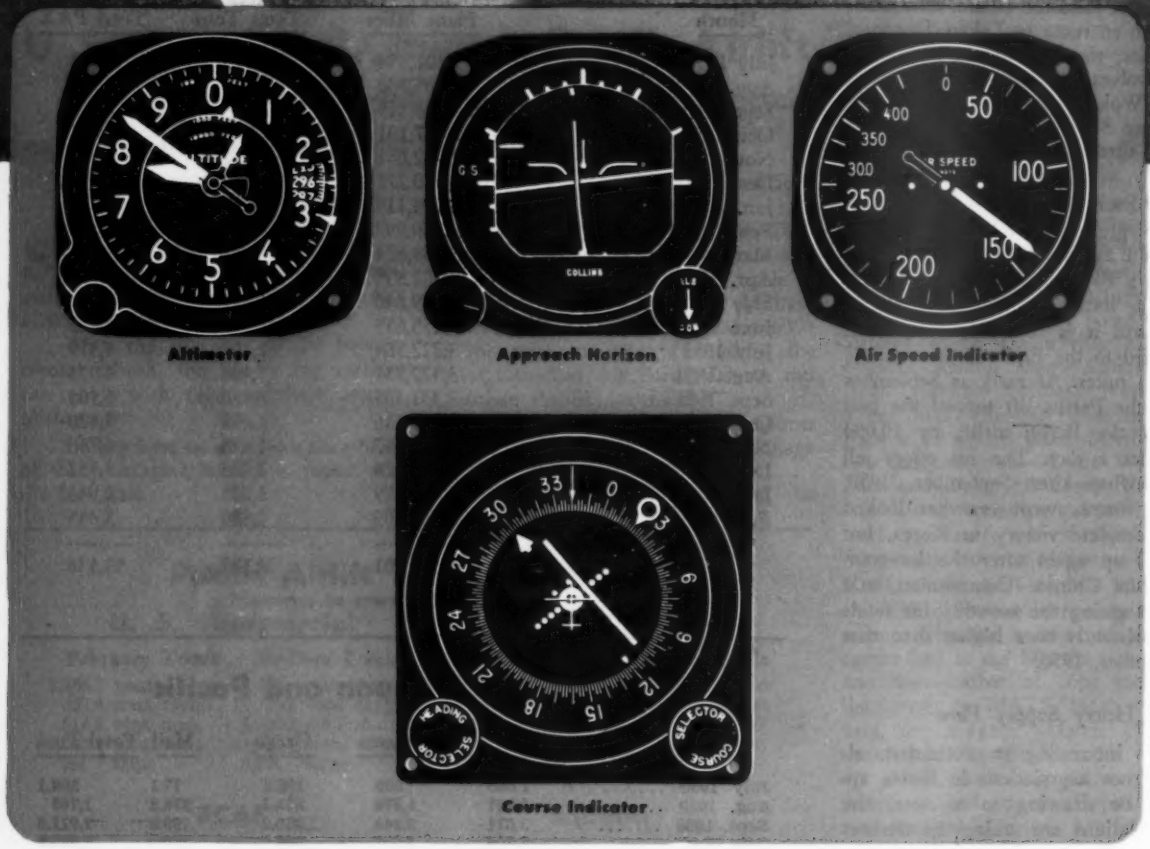
Month	Plane Miles	Total Tons	Total PAX
July 1950	2,301,354	840	4,130
Aug. 1950	3,605,330	1,566	7,082
Sept. 1950	3,218,815	1,616	7,040
Oct. 1950	2,967,101	1,271	6,272
Nov. 1950	1,732,651	632	2,580
Dec. 1950	2,770,271	1,220	3,593
Jan. 1951	3,784,115	1,737	4,862
Feb. 1951	3,269,997	1,558	4,572
Mar. 1951	3,159,624	1,331	3,969
Apr. 1951	3,402,855	1,616	4,753
May 1951	3,249,840	1,387	5,271
June 1951	3,255,655	1,447	4,463
July 1951	3,222,564	1,307	4,319
Aug. 1951	3,427,731	1,408	4,973
Sept. 1951	3,331,303	1,450	5,108
Oct. 1951	3,461,836	1,658	5,420
Nov. 1951	3,222,847	1,698	4,746
Dec. 1951	4,121,824	1,733	3,552
Jan. 1952	3,660,079	1,328	2,946
Feb. 1952	3,418,609	1,380	3,485
TOTAL	64,585,401	28,183	93,136

Figures above represent all carriers.

Inbound from Japan and Pacific

Date	Passengers	Patients	Cargo	Mail	Total Tons
July 1950	1,665	535	108.2	77.1	398.1
Aug. 1950	3,907	1,378	855.3	378.3	1,769
Sept. 1950	3,671	3,244	1,070.2	199.9	1,911.8
Oct. 1950	3,709	2,521	764.1	250.2	1,668.9
Nov. 1950	4,637	1,792	651.2	300.5	1,678.7
Dec. 1950	2,513	6,352	834.4	286.4	1,977.4
Jan. 1951	4,525	2,224	923.5	516.2	2,168.1
Feb. 1951	4,899	2,007	975.2	330.4	2,024.5
Mar. 1951	5,201	2,251	811.3	452.4	2,052.7
Apr. 1951	5,107	1,908	958	419.6	2,132.7
May 1951	6,074	1,931	663.5	539.5	2,082.7
June 1951	5,577	2,613	815.5	300.4	1,990.1
July 1951	6,096	1,786	781.1	298.4	1,930
Aug. 1951	6,588	1,618	615.6	392.2	1,929.4
Sept. 1951	9,333	1,484	386.5	313.7	1,994.3
Oct. 1951	9,690	2,292	670.2	372.6	2,350.8
Nov. 1951	7,742	2,144	596.5	385.4	2,032.6
Dec. 1951	8,909	2,009	758.9	567.9	2,489.2
Jan. 1952	8,302	1,418	768.7	345.6	2,119
Feb. 1952	8,286	1,047	676.7	345.6	2,078
TOTAL	116,431	42,554	14,684.6	7,072.3	38,688.0

precise ILS approach flying



COLLINS Radio Company is now giving demonstrations of a revolutionary new Flight Instrument System to airline pilots and technical personnel from coast to coast.

The purpose of the System, which has been under development and flight test for many months, is to give the pilot a clear *pictorial* presentation, on fewer instruments, of all the information he needs for precise ILS approach flying and en route navigation. Only four instruments are required in the basic flight group diagrammed above . . . the new Collins Approach Horizon, the Course Indicator, conventional altimeter and conventional air speed indicator.

Although complete VHF navigation and instrument letdown information is supplied the pilot on only two instruments, there is no possible source of confusion. Rather, there is a quicker, easier preception of the aircraft's exact position with respect to the selected course, and easily followed steering directions for making good the course. The Approach Horizon, in addition to showing attitude, is an "anticipator" instrument. It tells the pilot (1) he is steering the plane correctly or incorrectly to arrive smoothly on course, or (2) he is on course and steering correctly, or (3) he is on course but flying in a manner that won't keep him there. Thus on final approach this single instrument presents all information necessary for making an accurate ILS letdown without bracketing the localizer course or maneuvering violently to get on the runway after breakthrough.

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Collins
Approach Horizon



Collins
Course Indicator

The horizontal bar of the Approach Horizon operates much the same as a standard artificial horizon. Pitch information is shown by the stylized wings and fin of the airplane in the center of the instrument, which move up or down as the altitude of the aircraft is changed.

Displacement information with respect to the glideslope is obtained by noting the position of the pointer on the left in relation to the G. S. scale.

Electronically computed steering information for making good the localizer course is presented to the pilot by left or right deflection of the vertical pointer. To make good the course it is only necessary for the pilot to maneuver the airplane to keep the pointer centered. Drift is automatically compensated for by forcing the pilot to "crab" in order to keep the pointer centered.

The Approach Horizon may also be used to good advantage in flying compass headings.

The Course Indicator provides the pilot with a clear picture of his position with respect to his chosen course, just as though he could see his course as a broad white line marked on the ground below.

This single instrument presents to the pilot at a glance all the information which ordinarily must be assimilated by evaluating the readings of several other instruments, which the Course Indicator makes unnecessary.

The aircraft's compass heading is displayed continuously against the lubber line at the top of the instrument.

Displacement information with respect to a selected omnirange or localizer course is shown by the relative position of the small white airplane to the broad white bar which represents the course.

To-From information with respect to an omnirange station appears as small white flags on the appropriate side of the indicator center.

Thus, the Collins Flight Instrument System displays on these two instruments alone all necessary information for precise ILS approach flying: attitude, position and steering instruction.

Adoption of the Collins Flight Instrument System will replace two of the instruments in the conventional flight panel and eliminate several others. This simplification of the panel reduces expense and maintenance, of course, but more important, presents to the pilot all the necessary information, more clearly, on fewer instruments, and in a manner that requires a minimum of interpretation.

A booklet illustrating and describing the operation of the Collins Flight System is now available. We will be glad to mail you a copy on request.

FOR BETTER INSTRUMENT LANDINGS, IT'S . . .

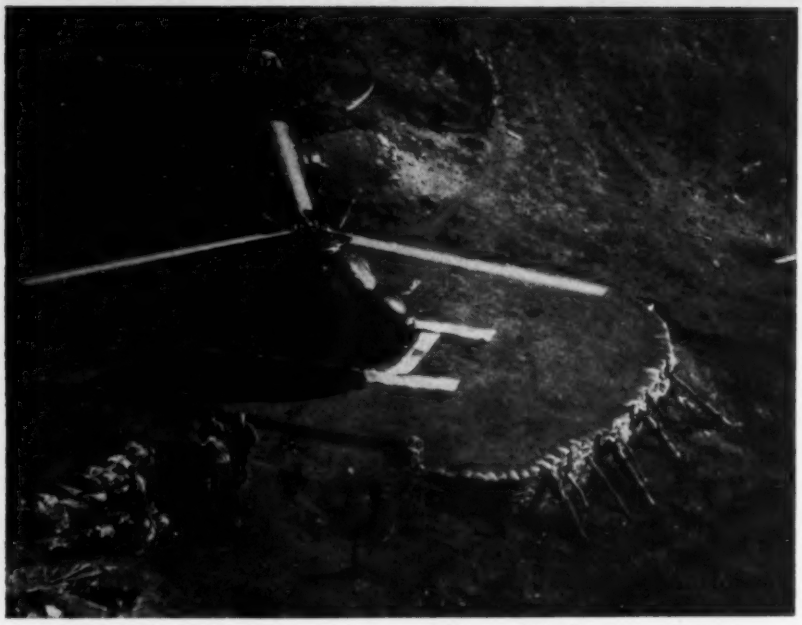
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PINT-SIZED landing areas, leveled out of Korean hillsides, serve the HRS.

Large 'Copters Prove Worth in Korea

Marine Squadron 161 finds transport-type 'copters rugged and efficient combat weapons.

THE LARGE, transport-type helicopter has come a long way in the past year. The military services now have several large types in production status and still larger types in development. But, while considerable attention has been called to the accomplishments of smaller helicopters in search, rescue, and evacuation work in Korea, a more significant development has gone relatively unnoticed. This is the fact that a transport helicopter unit has actually participated in combat in Korea and come through with flying colors.

Although the use of transport helicopters as assault and front-line resupply vehicles had been planned for some time and tried in Stateside maneuvers, 1951 saw the first use of the rotary-wing transport as a combat weapon, with the Marine Corps leading the way in a development which appears to have great promise for Marine and Army assault operations in the future.

'Copter in Combat

To Marine Transport Helicopter Squadron 161 fell the assignment of introducing the transport helicopter to combat. Squadron 161, commanded originally by Lt. Col. George W. Herring, was activated in January, 1951, several months after the start of the Korean war. It trained in El Toro, Calif., and embarked for Korea on August 1, arriving there with 240 enlisted men, 36 pilots, and 15 Sikorsky HRS helicopters. In the next five months, it participated in a number of important actions, proving conclusively that the transport 'copter has a place in combat.

First Mission

Squadron 161's first mission came only a few hours after the unit was assigned to work with the First Marine Division, a battalion of which was attacking an enemy-held hill. After a bitter fight, the battalion succeeded in taking the hill, but supplies were desperately low, casualties had been high, and the Reds were regrouping for a counterattack. There were no roads into the area, and even if there had been, there was still a 2,500-foot climb to the battle area. Obviously, the transport helicopter was the answer to the supply problem.

A level spot on the side of the hill was selected for a landing area and Squadron 161 went into action on a shuttle mission. Operating from about 40 miles behind the lines, the HRS's carried 1,000 pounds of payload each, some of it internally and the rest slung beneath the fuselage in cargo nets. Casualties were carried on the way out. In one hour the mission was completed; 17,000 pounds of ammunition, rations, water, and medical supplies had been delivered to the battalion, and 80 casualties removed on return trips. Headquarters estimated that without the helicopters it would have taken 24 vital hours to complete the resupply, which might have resulted in loss of the position.

Another type of mission was a troop move, the first of which was known as Operation Summit. The mission consisted of lifting an entire Marine company to the top of a 2,900-foot hill. There was a complication on this mission: there was no landing place available on the hill. This was solved by landing an advance party of 15 men on the hill by rope ladder while the helicopters hovered. The advance party cleared two landing spots within an hour and the shuttle started. In four hours of shuttling, as Col. Herring says, "Another piece of Korean real estate was ours."

Round Trip: 28 Minutes

In Operation Summit, Squadron 161 lifted 224 fully equipped troops and 18,000 pounds of cargo to the hill. Round-trip time for each shuttle mission was only 28 minutes.

A third type of mission was known as Operation Rabbit Hunt. Its objective was to seek out and destroy infiltrators who had penetrated the U.N. lines. To accomplish this, heavily armed Marines were placed in the cabins of the HRS's and provided with gun ports by leaving the door open and removing window panes. The planes operated in pairs. one furnishing cover when the other had to land. All suspicious housing was destroyed; civilians sighted were picked up and brought into headquarters. It took only a few weeks of this work to virtually end guerilla activity behind the lines.

The advantages of using large transport helicopters for operations of this type are obvious. In addition to the major element, speed in conducting an operation, trucks are kept out of artillery range and off heavily mined roads. Trucks bring the supplies and equipment up to range limit of enemy artillery, where the 'copter takes over.

Convertiplanes

That the operations of Squadron 161 were successful is beyond doubt, but there are two things which could make operations of this type even more successful, according to Col. Herring, now commanding officer of Marine Helicopter Training Squadron One: more speed, to cut the required shuttling time, perhaps even a convertiplane configuration, and helicopters or convertiplanes of larger payload. Of the convertiplane he says: "It's definitely coming—it's just a question of time."



IN PRODUCTION but not yet in service is the Chase C-123 assault transport, shown at left.

Military Lift Aircraft

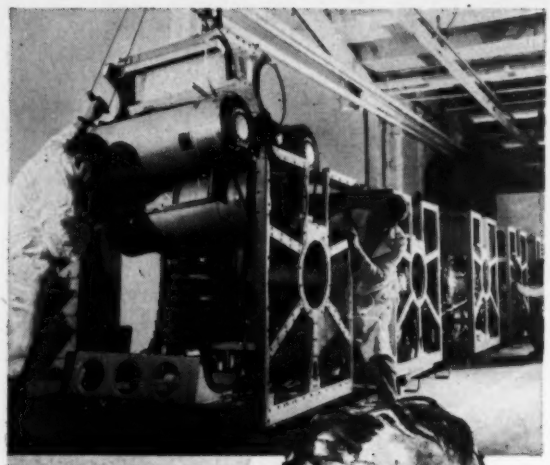
The bulk of the military air transport fleets (Military Air Transport Service, the Navy's Fleet Logistic Air Wings, and the specialized transport units like troop carrier and strategic transport squadrons) is still composed of aircraft types developed and produced during World War II, such as the Douglas C-54. A number of new types have been introduced to service since the war, however. The combined services operate about two dozen different types of transport aircraft. Some of the more recent types are pictured here.



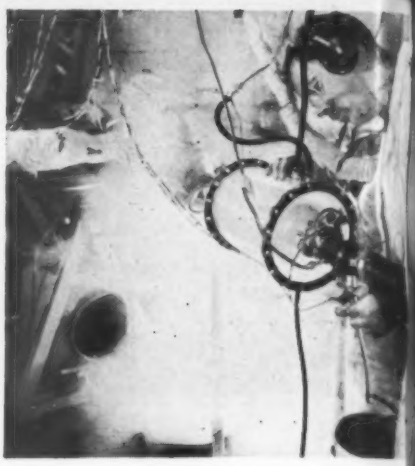
LIFT OPERATIONS include rescue work. Above, a Sikorsky H19 picks up litter patients.

LATEST MODEL of the Fairchild C-119, the standard troop carrier, is the enlarged C-119H.





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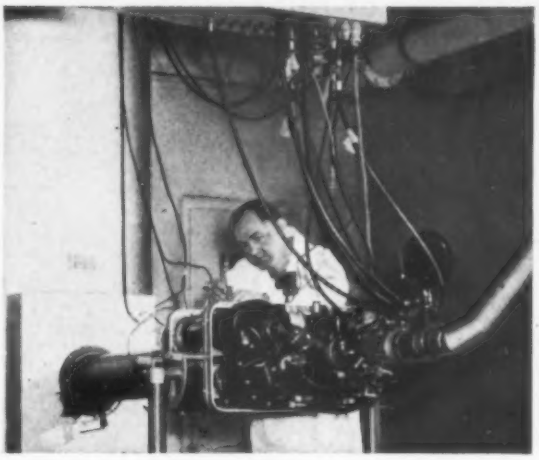
DESIGNE AN

Air Turbine Refrigeration

Gas Turbines



RESEARCH *Long range research policies have made the AiResearch Manufacturing Company a recognized industrial leader in many fields. Current lab facilities include 12 major research divisions, equipped to perform countless tests. Pictured at left under test is a moisture control unit for cabin air conditioning.*



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arch to achieve "the impossible"

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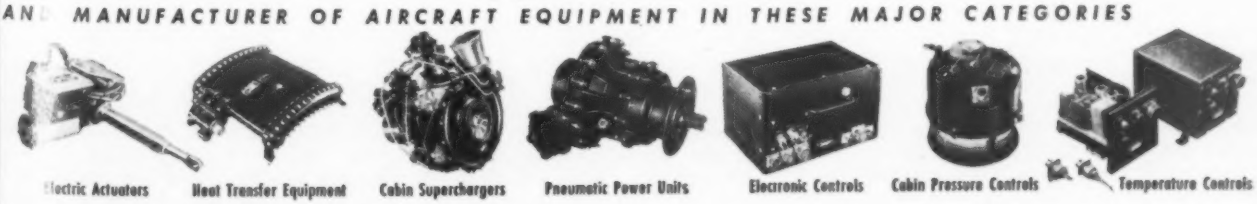
TOMORROW *this proven ability will be available to meet new problems in the advance of aeronautics and in other fields of industrial enterprise.*

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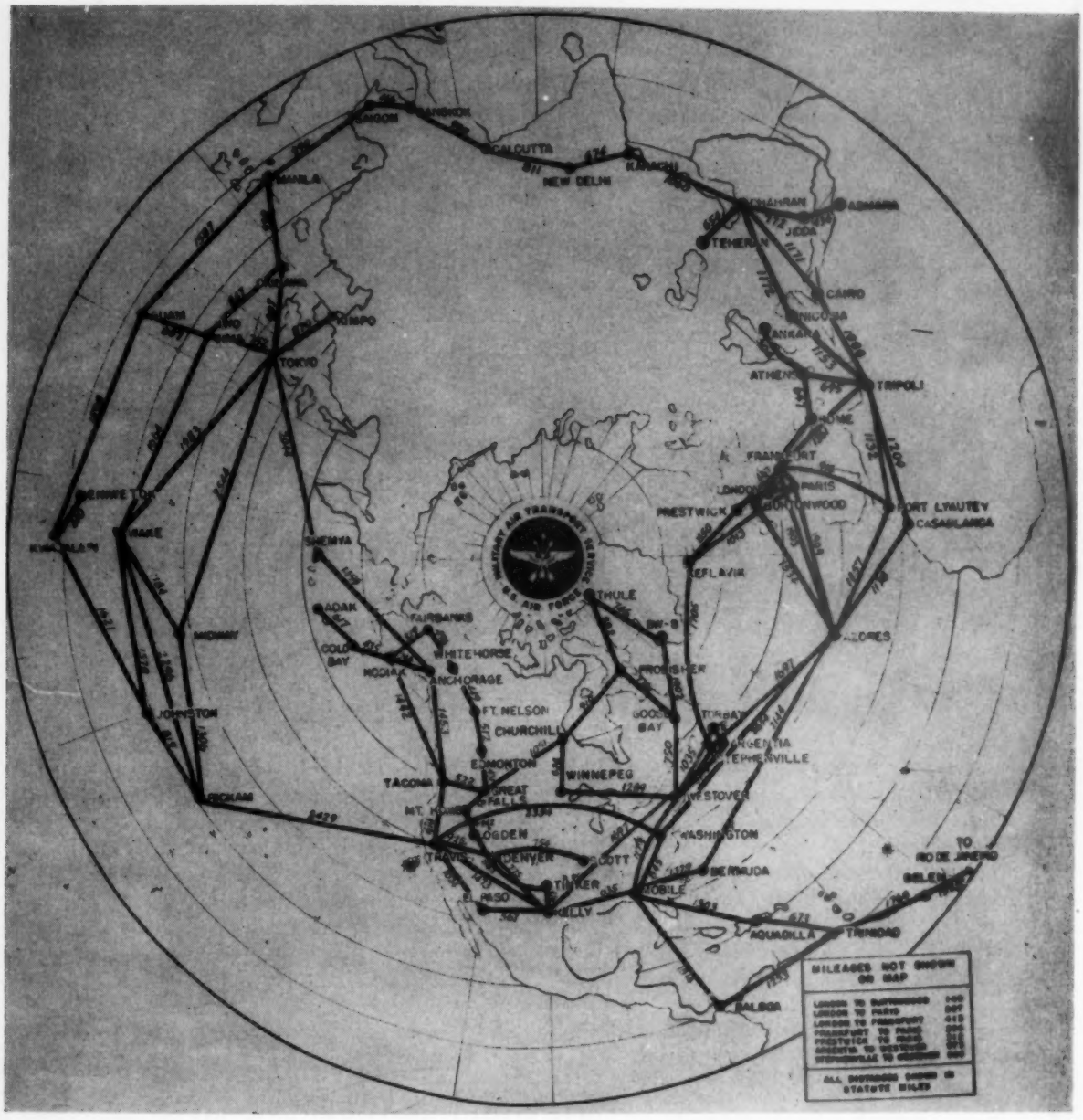
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International Routes of Military Air Transport Service



MATS Operations Built Around Variety of Services

MILITARY Air Transport Service, an outgrowth of the Unification Act of 1947, was officially organized on June 1, 1948, and charged with the mission of supplying the air transport and related requirements of all of the military services. A joint Air Force-Navy command, it was, in effect, a merger of the Air Transport Command and the Naval Air Transport Service.

In the Department of Defense organizational structure, MATS is essentially an Air Force command, Navy participation being on a limited basis, according to the Navy's lift demands on MATS. Headquarters is located at Andrews AFB, near Washington, D. C.

Actually, the name Military Air Transport Service is a misnomer, since its responsibilities go far beyond air transport. Although provision of military transport is its major function, MATS also controls:

- **Air Weather Service,** which charts and forecasts world-wide weather conditions.
- **Airways and Air Communications Service,** which handles the transmission of the weather data and flight traffic communications.
- **Air Rescue Service,** which supplies rescue facilities to both military and civilian aircraft all over the world.
- **Flight Service,** which monitors all military flights and coordinates them with civilian flights and air defense.



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pack one side of your bag for fun—bring your fanciest sports gear and informal clothes.

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Starts April 15th—Delta's Millionaire Dream Vacation* to **MIAMI BEACH**

FREE folder describes this summer's greatest travel bargain—7 days including Hotel and air fares—tax extra from **Chicago—$139.80** from **Cincinnati—$119.80**

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Delta AIR LINES

Ask your Travel Agent or write General Offices, Atlanta, Ga.

Serving the South and the Nation since 1926

As appearing in TIME Magazine, April 28, 1952



MATS' GROWING AIRLIFT capacity is indicated in this view of the new, 175,000-lb. Douglas C-124A Globemaster II.

• **Air Re-supply,** designed for specialized service to isolated units.

In addition to these services, MATS operates a transport fleet over 105,000 route miles all over the globe. Latest figures show a total of 572 transport aircraft assigned, of which about 345 are four-engined types. Forty-five of these planes, nearly all four-engined, are supplied by the Navy. MATS also has 415 other types, such as helicopters and amphibians for rescue work, specialized weather reconnaissance planes, and trainers. MATS is operated by 95,000 people, 80,000 of whom are Air Force, 4,000 Navy and 11,000 civilian.

Since its organization in 1948, MATS has flown more than 2,250,000,000 passenger-miles and over 620,000,000 ton-miles.

Some important command changes have taken place in the past year. Maj. Gen. Joseph Smith has replaced Lt. Gen. Laurence S. Kuter as commander and in the vice commander post Rear Adm. Hugh Goodwin has taken over from Rear Adm. John P. Whitney.

FLAW: Navy Airlift Has Grown

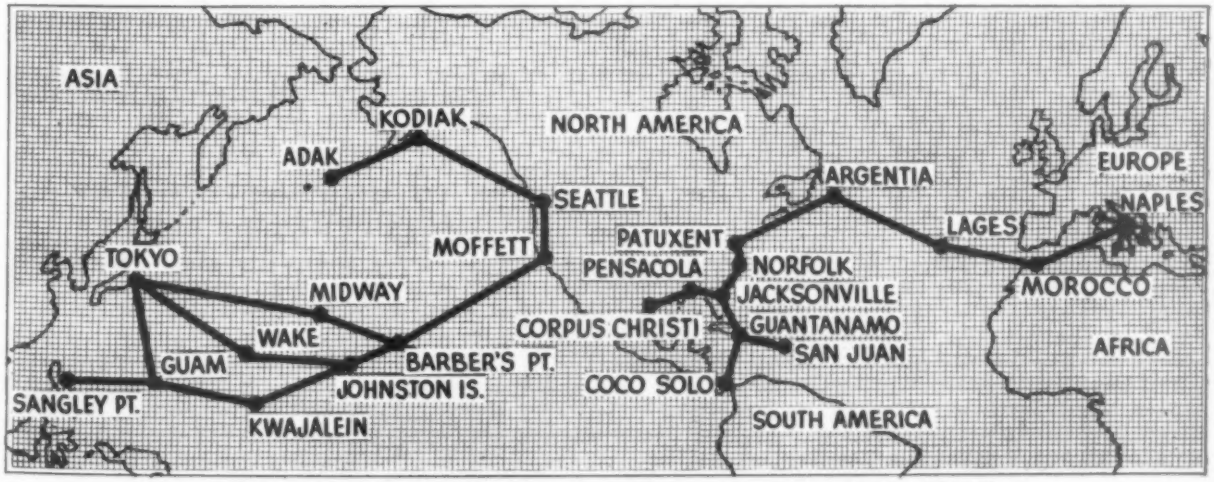
In addition to its participation in Military Air Transport Service, the Navy has another air transport organization, known as the Fleet Logistic Air Wings.

When the Naval Air Transport Service was merged with the Air Transport Command to form MATS, a Department of Defense directive stated that the Navy would be permitted to maintain another transport unit, operating independently of MATS, to handle the specialized air transport requirements of the sea-going fleet. This unit started as a small organization, but, due largely to the exigencies of the Korean war and the increased fleet activity in Pacific waters, has grown into a fairly large route system operating on four continents.

Actually it is not a single organization but rather two separate Fleet Logistic Air Wings. It has no overall command but takes its orders from fleet commanders.

The two units which comprise the Fleet Logistic Air Wings are Fleet Logistic Air Wing Atlantic/Continental, with headquarters at Naval Air Station, Patuxent River, Md., and Fleet Logistic Air Wing Pacific, headquartered at Naval Air Station, Alameda, Calif. The combined units have 847 officers and 5,017 enlisted personnel.

The wings operate several different types of aircraft, the numbers of which are not releasable. As in MATS, the standard type is the Douglas R5D (Air Force C-54). Other land-based types include the Douglas R4D (C-47) and R6D (the DC-6, just now coming into service) and the Curtiss R5C (C-46). FLAW also has two heavy transports, the Lockheed R6V Constitutions. Water-based types include the Martin PBM Mariner and the huge Martin JRM Mars flying boats, four of which are in service with the Pacific wing.

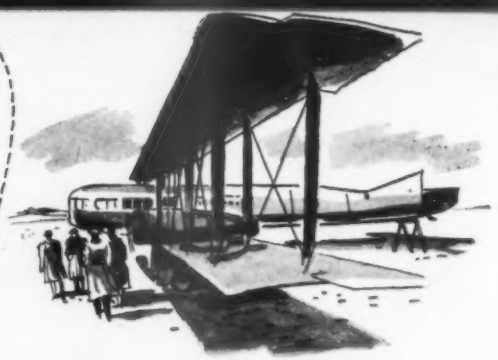


NAVY'S Fleet Logistic Air Wings operate to four continents, independently of MATS.

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THE WORLD'S LARGEST AIRLINE!

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Largest network of air routes. AIR FRANCE serves 151 destinations on 6 continents, offers all-Constellation service to Europe. Veteran pilots—many of whom have logged a million miles in the air—fly the AIR FRANCE Constellations. AIR FRANCE enjoys world-wide reputation for dependability of its operations.



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"THE PARISIAN"—luxury trans-Atlantic air travel—an experience in gracious living. Departures from New York, Boston, and Montreal to Paris, Frankfurt, Berlin, Rome.

"THE PARISIAN SPECIAL"—The world-famous ultra-de-luxe AIR FRANCE flight—non-stop overnight from New York to Paris. Ten dollars additional fare.

NEW TOURIST SERVICE, $522* summer season, round-trip fare. New-type Constellations—most powerful aircraft available to the tourist traveler.

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AIR FRANCE

THE **LUXURY** WORLD-WIDE AIRLINE

****Delicious meals obtainable at moderate prices.***

Airline Income at Record High — Taxes, Too

	Operating Incomes (Before Taxes)	Income Tax Payments
• Domestic trunklines	$106,000,000	$57,241,000
• International lines	16,000,000	9,263,000
• Local-service lines	653,00	536,000
• TOTAL	$122,653,000	$67,040,000

By GOTCH & CRAWFORD
Planning Consultants

NET OPERATING income of $122 million (before taxes) realized by all U. S. certificated air carriers in 1951 highlights a record performance for all three classes—trunkline, international, and local service. Earnings in 1951 were 75% above 1950, the best year heretofore experienced by the industry. Domestic trunk carriers netted an unprecedented $68 million before mail pay.

More than 13.3 billion revenue passenger-miles were the foundation for the year's excellent results, with domestic operation accounting for 10.5 billions. Passenger revenues for the year increased by $171 million over 1950 to a total of $776 million.

DOMESTIC TRUNKS

The domestic trunkline carriers (including three territorial) improved their total operating revenues during 1951 at double the rate of improvement attained during 1950. Revenues moved from one-half billion dollars in 1950 to two-thirds billion, a 26% gain.

During the year the operating expenses of the trunks increased 20%. Their net operating income accordingly shattered the record set in 1950 by jumping 70% to a new high of $106 million.

The remarkable improvement in trunkline earnings was accompanied by a sizeable reduction in mail pay. Total cost to the Post Office Department was down $9 million, a 19% cut, while at the same time service performed was up 36%, with 63 million mail ton-miles flown.

Mail pay, which in 1950 represented 8.8% of total revenues, accounted for only 5.7% of total revenues in 1951. And as a most striking development, the Post Office Department in 1951 paid the trunkline industry an average across-the-board rate of only 60c per mail ton-mile. Less than two years ago 60c was considered a reasonable service rate for the Big Four—American, Eastern, Trans World, and United.

Other 1951 unit results remained almost unchanged from 1950 figures. Yields hovered around 5½ cents per revenue passenger-mile and 55c per volume ton-mile. Expense levelled off at 3.7c per available seat-mile and 28c per available ton-mile. There is significance in the fact that unit costs have levelled off after a consistent downward trend in recent years.

There is a question whether unit costs can be held to the levels experienced during the past two years. Some carriers contend that a turning point has been reached, with higher unit costs in prospect.

As in prior years, the Big Four accounted for roughly 70% of total trunkline business. The remaining trunks nevertheless experienced a relatively greater increase in earnings, advancing from $9 million net operating income in 1950 to $23 million, while the Big Four went from $53 million to $83 million.

INTERNATIONAL

Preliminary reports for 1951 operations of eleven international and overseas carriers indicate that this group will show a net operating income of $16 million, a 58% increase over the $10 million net in 1950.

U. S. mail revenues for 1951 decreased to $53 million from a level of $55 million in the preceding year. Revenues other than U. S. mail pay increased $30 million to a total of $232 million. The bulk of the gain was in passenger revenues, which increased by more than $24 million. This 15% gain in passenger revenues developed while yield per revenue passenger-mile remained virtually unchanged.

Total operating expenses increased 8.4%, contrasted with a 10.4% improvement in operating revenues. Although gross expense increased, unit costs for the year did not increase over 1950. Cost per available ton-mile flown was 44c in both years. Cost per available seat-mile flown reduced from 6.5c in 1950 to 6.2c in 1951, due principally to increased seat-density.

As a result of the general improvements above, mail pay required for the group to break even dropped down from $45 million in 1950 to $37 million in 1951. Three carriers—American, Colonial, and Eastern—realized a net profit before mail pay.

LOCAL SERVICE

Local-service operators reported net operating income of two-thirds of a million dollars in 1951, a modest increase over 1950.

Total operating revenues, total operating expenses and available seat-miles flown all showed roughly a 30% increase over 1950 results. However, it is noteworthy that volume of passenger travel increased 50% and passenger revenues increased 58%. More than 1½ million passengers rode local-service lines in 1951. Passenger load factor increased from 33% in 1950 to 38% in 1951, producing additional passenger revenues at the rate of 11c per revenue aircraft-mile flown.

The 32% increase in total operating expenses during 1951 was consistent with a 29% increase in available seat-miles flown. Unit cost per seat-mile increased slightly from 4.5c in 1950 to 4.6c in 1951. However, such unit results were affected by a trend to larger equipment, and unit cost per revenue aircraft-mile increased 11c, largely offsetting the 11c increase per mile in passenger revenues mentioned above.

Mail revenues for local-service carriers increased 14.5% over 1950, totalling $18.8 million in 1951; but mail revenues per aircraft-mile dropped slightly from 48.8c in 1950 to 48.5c in 1951.

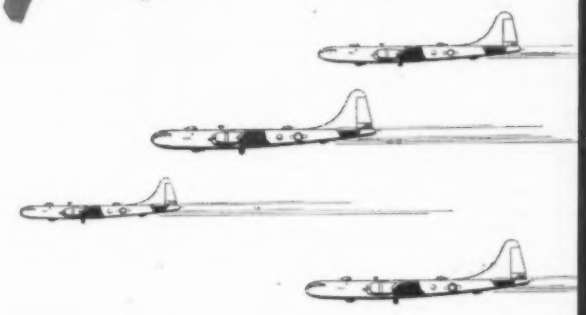
$67 Million in Taxes

Income tax payments of $67 million represented 73% of total mail revenues paid the industry. In the case of trunk operations, income taxes exceeded mail revenues by more than $20 million. American led industry tax payers with more than $17 million paid, and Eastern paid well over $13 millions. Seven carriers whose income taxes exceeded their mail revenues were American, Eastern, United, Capital, Delta, National, and Western.

Note: Income tax estimates above represent payments applied to operating and non-operating revenue combined.

See pages 42-43 for comparison of U. S. scheduled airline revenues-expenses for 1951-50. Data from official airline reports to CAB. ⟶

The New AC 171





SELECTED BY THE ARMED FORCES FOR RECORD-SIZED PRODUCTION CONTRACT

Among the many features of the new AC-171 is the *exclusive* one-piece insulator — which eliminates the possibility of downward flashover from contact point to ground.

It also facilitates the cleaning of the terminal well, because it eliminates the dirt trap between the core insulator and the shielding barrel insulator.

AC SPARK PLUGS

AC SPARK PLUG DIVISION GM GENERAL MOTORS CORPORATION

	Passenger Revenues 1951	Passenger Revenues 1950	Freight Revenues 1951	Freight Revenues 1950	Express Revenues 1951	Express Revenues 1950	Mail 1951
American	$137,683,090	$ 97,101,528	$ 7,353,634	$ 6,966,987	$ 3,279,692	$ 2,575,344	$ 6,680,182
Braniff	15,254,677	12,409,384	464,159	409,087	361,547	349,663	1,320,779
Capital	34,064,248	22,179,403	1,119,595	1,547,848	1,007,768	786,050	1,175,957
Caribbean	696,183	546,821	28,728	28,735	.....	.....	207,387
C & S	9,978,331	6,796,233	220,441	216,459	267,091	251,878	1,202,976
Colonial	3,801,918	2,899,095	37,676	42,970	39,124	33,954	831,559
Continental	6,290,960	4,100,018	146,625	124,875	60,521	45,178	1,189,352
Delta	22,358,416	15,595,831	765,540	586,733	421,010	323,437	998,067
Eastern	87,224,599	69,084,327	1,062,647	1,873,263	1,808,615	1,556,547	2,244,575
Hawaiian	2,982,363	2,903,928	346,103	249,768	112,365	122,198	308,993
Inland *	2,533,462	2,255,297	46,126	39,892	34,028	25,483	474,767
MCA **	7,180,152	5,950,468	138,806	121,691	105,441	85,630	1,334,450
National	22,596,971	13,413,718	1,070,961	476,849	174,124	216,058	1,087,092
Northeast	5,535,763	4,440,034	106,770	109,055	98,221	80,583	1,519,980
Northwest	26,237,636	26,414,235	924,262	1,307,725	647,938	732,204	3,988,445
Trans Pacific ***	960,618	654,006	18,585	10,201	6,302	2,557	126,325
TWA	83,184,168	60,889,741	3,010,458	2,666,529	2,703,446	2,225,847	5,366,667
United	95,209,193	77,959,299	4,399,611	5,043,216	3,537,732	3,112,373	6,887,757
Western *	11,154,442	8,609,782	162,201	164,567	159,985	168,678	737,206
TOTALS	**$574,927,190**	**$434,203,148**	**$ 21,422,928**	**$ 21,986,450**	**$ 14,824,950**	**$ 12,693,662**	**$37,682,518**

* Operations of Western and its subsidiary, Inland, should be considered as consolidated, although reports are filed separately as shown here. ** Figures do not include operations of local service segment (Route 106) awarded MCA by CAB in the Parks Air Lines Investigation Case. Figures covering Route 106 are carried separately in local service airlines tabulation. *** Carrier authorized to transport mail May 15, 1951.

International Airlines

	Passenger Revenues 1951	Passenger Revenues 1950	Freight Revenues 1951	Freight Revenues 1950	Express Revenues 1951	Express Revenues 1950	U. S. Mail 1951
American	$ 4,205,255	$ 3,406,570	$ 354,872	$ 274,300	$ 3,496	$ 4,495	$ 123,315
American Overseas *	.....	13,075,311	.....	965,338	.....	.....	.....
Braniff	4,895,172	3,318,890	370,218	253,702	.....	.....	2,068,410
C & S	2,205,371	1,916,124	201,379	193,837	.....	.....	1,853,267
Colonial	1,706,344	1,098,515	9,620	12,943	.....	.....	172,913
Eastern	3,668,237	799,340	71,294	56,309	.....	.....	310,412
National	1,855,367	1,433,138	65,660	27,245	20,422	57,721	39,821
Northwest	8,955,129	6,734,160	2,728,759	2,025,240	70,575	57,052	3,800,470
Pan American**							
Latin Amer.	44,973,438	40,667,417	8,028,548	7,587,516	.....	.....	7,227,000
Atlantic	40,392,388	28,687,301	4,677,512	3,419,562	.....	.....	13,685,551
Pacific	19,795,843	15,832,098	3,162,992	2,337,732	.....	.....	11,071,664
Alaska	3,592,520	2,651,240	1,267,363	962,567	.....	.....	1,035,760
Panagra**	11,324,438	9,574,390	.....	.....	1,055,285	724,589	2,107,265
TWA †	31,223,957	27,385,651	2,973,343	2,544,335	.....	.....	9,013,659
United	5,914,693	3,995,923	150,343	145,908	.....	.....	676,871
TOTALS	**$184,708,152**	**$160,576,068**	**$ 24,061,903**	**$ 20,806,534**	**$ 1,149,778**	**$ 843,857**	**$53,186,378**

* Figures for AOA are through September 25, 1950, effective date of PAA-AOA merger. ** 1951 figures are preliminary. † TWA's mail revenues computed at temporary rates in effect prior to issuance by CAB of show cause orders proposing reduction in rates of compensation.

Local Service Airlines

	Passenger Revenues 1951	Passenger Revenues 1950	Freight Revenues 1951	Freight Revenues 1950	Express Revenues 1951	Express Revenues 1950	Mail 1951
All American*	$ 1,839,762	$ 1,290,529	$.....	$.....	$ 62,770	$ 47,757	$ 1,875,361
Bonanza**	400,552	262,492	7,196	4,876	1,386	810	549,397
Central	249,255	74,343	5,073	.....	707	.....	1,030,606
Empire	407,654	369,962	.....	.....	8,305	5,833	607,310
Frontier***	1,418,127	913,125	83,520	43,699	24,764	19,864	2,508,989
Lake Central	281,294	119,238	.....	.....	28,732	15,972	516,565
MCA†	501,609	106,078	10,562	3,519	17,348	2,876	274,140
Mid-West	19,854	47,596	.....	.....	.....	.....	380,904
Ozark‡	462,633	34,581	.....	.....	23,215	2,350	1,656,862
Piedmont	2,604,954	1,531,327	38,849	37,552	34,274	29,571	924,332
Pioneer	2,287,053	1,793,060	56,331	41,240	20,072	17,657	1,080,986
Robinson§	989,994	584,184	21,305	11,712	25,537	18,687	1,150,394
Southern	948,026	360,787	.....	.....	28,994	14,670	1,628,492
Southwest	1,452,523	1,139,969	47,803	43,925	16,857	18,877	789,131
Trans-Texas	871,646	675,450	23,750	18,688	11,294	10,554	1,652,239
West Coast	640,262	555,068	15,100	6,635	6,017	6,066	651,084
Wiggins	23,382	17,793	.....	.....	1,298	.....	314,679
Wis. Central	860,598	427,378	.....	.....	45,173	18,637	1,181,596
TOTALS	**$ 16,259,178**	**$ 10,302,960**	**$ 309,489**	**$ 211,846**	**$ 356,743**	**$ 230,201**	**$ 18,773,239**
Helicopter Mail Service							
Hel. Air Serv.§	.....	.....	.....	.....	.....	.....	510,801
Los Angeles	.....	.....	.....	.....	.....	.....	376,405

* 1951 figures include retroactive mail payment of $238,597 applicable to period of July 1 to December 31, 1950. ** 1951 figures are preliminary. *** Frontier's figures for 1950 are a combination of Challenger Airlines and Monarch Air Lines, since companies merged and began operating under the name of Frontier Airlines, Inc. on June 1, 1950. † Figures cover local service segment (Route 106) awarded MCA by CAB in the Parks Air Lines Investigation Case. ‡ Began operations September 26, 1950. § 1951 figures include retroactive mail payments.

Trunk Lines

Revenues-Expenses, 1951-50

Revenues 1950	Total Operating Revenues 1951	1950	Total Operating Expenses 1951	1950	Net Operating Income 1951	1950	
$ 5,916,510	$157,768,744	$114,653,557	$128,038,172	$ 91,734,730	$ 29,730,572	$ 22,918,827	..... American
2,193,719	17,763,677	15,702,258	15,409,296	13,597,855	2,354,381	2,104,404	..... Braniff
3,816,875	38,702,493	29,816,460	34,993,348	27,579,706	3,709,145	2,236,753	..... Capital
252,528	989,792	872,835	894,759	837,571	95,033	35,265	..... Caribbean
1,747,320	11,826,791	9,146,331	10,909,913	8,442,261	916,878	704,070	..... C & S
1,143,487	4,793,394	4,176,594	4,998,811	4,562,259	—205,417	—385,664	..... Colonial
1,729,247	8,120,975	6,221,793	7,377,068	5,837,886	743,907	383,907	.... Continental
1,770,067	25,312,732	18,869,918	20,675,101	16,718,084	4,637,631	2,151,833	..... Delta
3,372,004	94,158,530	77,416,194	74,675,718	67,914,584	19,482,811	9,501,610	..... Eastern
32,733	3,851,460	3,492,055	3,764,606	3,497,715	86,854	—5,660	..... Hawaiian
715,612	3,116,679	3,064,515	2,812,913	2,584,139	303,766	480,376	..... Inland
1,658,714	9,006,270	8,038,745	8,475,971	7,350,464	530,299	688,281	..... MCA
1,747,962	26,093,204	16,948,674	20,645,977	14,479,037	5,447,227	2,469,637	..... National
1,519,268	7,366,859	6,360,546	6,977,584	6,240,008	389,275	120,537	..... Northeast
4,411,310	32,594,207	33,619,236	30,391,614	36,514,162	2,202,593	—2,894,925	..... Northwest
.....	1,370,263	848,174	1,407,157	950,770	—36,894	—102,596	.. Trans-Pacific
5,853,250	96,689,176	73,180,399	83,217,306	66,494,315	13,471,868	6,686,083	..... TWA
7,341,612	112,659,627	95,711,415	92,728,367	81,493,396	19,931,260	14,218,019	..... United
1,374,420	12,547,487	11,181,979	10,254,126	9,995,095	2,293,361	1,186,884	..... Western
$46,596,638	$664,732,360	$529,321,678	$558,647,809	$466,824,037	$106,084,550	$ 62,497,641	..... TOTALS

International Airlines

Revenues 1950	Total Operating Revenues 1951	1950	Total Operating Expenses 1951	1950	Net Operating Income 1951	1950	
$ 93,480	$ 4,998,554	$ 4,031,144	$ 4,820,971	$ 3,702,449	$ 177,583	$ 328,694	..... American
2,981,061	.....	18,325,117	.....	18,818,747	.....	—493,630	American Overseas
1,937,442	7,592,795	5,663,610	7,706,387	5,577,129	—115,592	86,481	..... Braniff
1,514,928	4,410,139	3,738,713	3,461,945	3,448,721	948,194	289,991	..... C & S
315,352	1,929,160	1,458,675	1,639,707	1,343,642	289,453	115,034	..... Colonial
65,789	4,160,875	1,089,474	3,472,166	1,007,241	688,706	82,233	..... Eastern
54,026	2,014,322	1,598,450	2,441,220	1,684,748	—426,898	—86,298	..... National
4,466,500	16,602,067	14,214,647	15,744,423	11,518,476	857,644	2,696,171	..... Northwest
7,223,793	64,763,848	59,989,248	65,369,708	57,684,113	—605,860	2,305,135	Pan American .... Latin Amer.
10,735,253	64,091,486	46,535,188	62,537,979	50,382,394	1,553,507	—3,847,206	..... Atlantic
11,709,687	35,765,007	31,815,596	29,182,677	28,833,519	6,582,330	2,982,076	..... Pacific
1,306,301	6,147,658	5,163,203	5,368,775	4,782,615	778,883	380,589	..... Alaska
3,720,246	16,126,842	15,287,916	14,499,480	13,342,170	1,627,362	1,945,746	..... Panagra
9,069,503	48,094,183	43,811,833	42,960,329	38,825,334	5,133,854	4,986,499	..... TWA
495,709	8,566,068	5,682,601	9,970,389	7,271,195	—1,404,321	—1,588,594	..... United
$55,689,070	$285,263,004	$258,405,415	$269,178,156	$248,222,493	$ 16,084,847	$ 10,182,921	..... TOTALS

Local Service Airlines

Revenues 1950	Total Operating Revenues 1951	1950	Total Operating Expenses 1951	1950	Net Operating Income 1951	1950	
$ 1,575,209	$ 3,857,936	$ 2,933,614	$ 3,733,212	$ 3,245,869	$ 124,724	$ —312,255	.. All American
516,572	976,655	796,007	1,051,977	852,625	—75,322	—56,618	..... Bonanza
636,334	1,356,849	719,735	1,624,914	775,047	—268,071	—55,312	..... Central
603,186	1,075,606	1,001,554	1,041,257	977,476	34,350	24,078	..... Empire
2,204,321	4,104,653	3,210,071	4,159,376	3,385,163	—54,723	—175,091	..... Frontier
409,067	957,945	845,888	1,131,435	820,116	—173,490	25,771	.. Lake Central
84,148	812,093	199,645	936,660	206,543	—124,567	—6,897	..... MCA
562,051	401,056	610,121	380,188	576,047	20,868	34,074	..... Mid-West
121,651	2,150,888	159,937	2,287,313	305,336	—136,425	—145,398	..... Ozark
1,478,886	3,653,417	3,104,596	3,407,524	2,830,377	245,893	274,220	..... Piedmont
1,279,648	3,601,892	3,335,140	3,365,944	3,106,861	235,948	228,279	..... Pioneer
564,132	2,265,290	1,192,206	1,598,345	1,207,920	666,945	—15,714	..... Robinson
1,374,063	2,627,902	1,762,917	2,750,492	1,646,370	—122,590	116,546	..... Southern
943,888	2,390,964	2,213,745	2,352,265	1,952,668	38,699	261,077	.... Southwest
1,777,483	2,630,692	2,496,803	2,602,485	2,354,594	28,207	142,209	.. Trans-Texas
685,538	1,355,988	1,273,254	1,171,867	1,174,902	184,121	98,352	.... West Coast
228,854	344,052	247,137	304,965	256,414	39,087	—9,276	..... Wiggins
1,355,145	2,097,607	1,806,432	2,108,061	1,642,416	—10,454	164,016	.. Wis. Central
$ 16,400,176	$ 36,661,481	$ 27,908,802	$ 36,008,280	$ 27,316,744	653,200	592,061	..... TOTALS
			Helicopter Mail Services				
371,423	511,673	371,484	398,728	329,616	112,947	41,868	.. Hel. Air Serv.
419,852	380,305	424,409	321,786	402,868	58,519	21,541	... Los Angeles

Selected Airline Expenditures, Year Ended Sept. 30, 1951

Company	Total Assets	Passenger Food Expense	Other Passenger Supplies	Advertising Space	Other Advertising	Aircraft Engine Fuel and Oil	Shop-Servicing Supplies	Employment	Annual Payroll	Average Wage
All-American	$ 2,279,634	$ 679	$ 2,804	$ 57,947	$ 16,578	$ 479,200	$ 22,402	459	$ 1,789,380	$3,898
American	141,749,551	3,747,436	600,279	1,505,912	709,155	17,986,461	830,734	13,885	59,464,560	4,283
Bonanza	585,458	2,791	2,228	15,429	11,919	124,775	8,146	129	524,561	4,066
Braniff	15,898,538	571,990	92,377	389,695	272,016	3,218,927	140,936	2,727	10,515,024	3,855
Capital	19,237,677	824,143	197,914	1,062,326	157,565	5,196,335	270,997	3,999	15,826,145	3,958
Caribbean	594,451	2,128	1,404	4,852	9,078	96,243	5,466	156	433,694	2,780
Central	1,080,681	162	1,073	11,780	13,683	144,795	17,737	278	956,624	3,441
C & S	11,484,846	406,471	50,039	249,234	139,161	1,964,205	127,169	1,465	6,123,150	4,179
Colonial	3,713,205	244,305	44,870	71,459	38,330	803,843	22,076	642	2,612,223	4,068
Continental	4,710,567	101,024	9,291	92,272	69,168	899,940	53,210	842	3,448,434	4,096
Delta	16,364,502	535,122	68,359	584,566	237,552	3,063,573	172,373	2,450	9,550,688	3,898
Eastern	95,546,146	1,713,284	383,586	1,184,003	578,400	11,948,808	434,366	8,308	33,462,754	4,016
Empire	482,374	5,186	1,841	11,115	8,654	173,164	7,448	116	543,837	4,688
Flying Tigers	7,913,334	none	none	28,896	18,679	1,082,604	35,014	1,446	5,875,828	4,064
Frontier	1,637,981	23,858	10,741	38,168	38,666	607,639	30,096	566	2,172,637	3,839
Hawaiian	2,570,520	none	9,911	28,544	43,566	329,010	15,010	451	1,964,772	4,357
Helicopter A. S.	370,536	none	none	100	none	18,333	1,672	47	193,287	4,112
Inland	1,560,096	78,664	8,210	57,979	4,095	402,161	3,506	224	1,088,272	4,858
Lake Central	662,590	2,430	2,642	17,623	9,344	146,604	5,728	156	545,464	3,497
Los Angeles	330,762	none	none	none	none	20,206	1,070	38	176,384	4,642
Mid-Continent	7,392,114	168,949	26,154	154,245	61,158	1,126,952	29,811	1,239	4,646,485	3,750
Mid-West	108,745	9	30	1,340	267	39,479	1,170	44	164,204	3,732
National	15,520,453	635,605	108,012	907,366	120,142	3,469,028	132,397	2,176	8,339,476	3,832
Northeast	5,235,925	197,833	31,120	95,545	82,647	753,932	49,453	781	3,115,700	3,989
Northwest	47,624,320	809,397	257,854	591,144	372,469	6,280,231	512,350	5,231	23,037,665	4,404
Ozark	1,288,415	2,373	2,825	1,846	6,046	238,866	13,617	319	1,228,038	3,850
Panagra	22,192,155	179,932	91,853	427,578	188,985	1,802,962	45,269	1,564	3,500,658	2,238
Pan American	201,891,058	.....	.....	.....	.....	.....	.....	.....	.....	.....
Atlantic	.....	1,125,329	266,832	1,366,273	959,935	8,782,239	256,690	4,235	17,537,184	4,141
Latin American	.....	1,194,599	475,759	977,956	786,464	7,981,960	595,109	6,821	25,909,851	3,798
Pacific	.....	392,201	203,803	363,082	333,720	4,269,907	162,496	3,092	13,131,149	4,246
Alaska	.....	135,822	12,630	27,062	55,240	732,321	7,704	347	1,937,918	5,585
Non-divisional	.....	.....	.....	.....	.....	.....	.....	1,709*	6,165,570	3,608
Piedmont	2,040,675	10,500	7,654	76,270	37,844	511,936	7,046	453	1,616,855	3,569
Pioneer	1,819,507	48,510	10,898	62,586	34,889	462,626	17,972	458	1,781,799	3,890
Robinson	1,322,813	1,436	642	7,910	5,186	209,149	12,486	204	843,434	4,134
Resort	2,522,852	64,480	3,113	(13,847)	(5,565)	629,190	1,942	139	884,942	6,366
Riddle	178,597	none	none	1,890	1,417	176,505	2,314	99	386,890	3,900
Slick	5,545,556	none	none	5,254	3,806	1,860,869	80,265	1,151	4,632,848	4,025
Southern	1,102,813	179	2,789	26,785	36,171	395,317	28,604	403	1,364,199	3,386
Southwest	1,662,028	122	2,202	55,362	23,850	281,500	19,426	299	1,253,520	4,192
TWA	121,100,387	2,704,664	502,998	1,875,011	1,932,275	15,371,604	572,262	13,037	55,609,346	4,265
Trans-Pacific	794,200	37	2,352	13,871	21,629	132,318	4,849	217	790,597	3,643
Trans-Texas	1,053,484	21,955	6,853	45,550	42,895	363,384	13,699	373	1,291,935	3,464
U. S. Airlines	585,420	none	none	none	none	259,621	2,562	18	69,912	3,884
United	111,045,335	1,953,177	615,238	1,041,934	1,299,004	13,653,875	615,455	11,156	50,209,809	4,500
Western	12,847,913	306,276	39,478	264,275	112,052	1,337,527	100,480	1,194	5,234,388	4,384
West Coast	1,128,985	83	625	9,997	22,492	132,006	2,558	161	631,722	3,924
Wiggins	146,497	none	none	1,064	921	40,564	1,238	31	132,660	4,280
Wis.-Central	970,705	109	834	27,272	15,475	199,632	7,097	272	1,077,853	3,963
TOTALS	**$890,170,248**	**$18,213,250**	**$4,160,177**	**$13,819,377**	**$8,876,800**	**$118,164,952**	**$5,418,898**	**94,357**	**$388,774,587**	**$4,120**
Totals year ending 9/30/50	818,250,898	12,966,923	3,465,601	13,168,903	7,582,445	104,722,385	4,458,499	81,070	319,840,489	3,945
Totals year ending 9/30/49	720,176,728	13,007,374	3,599,919	12,029,097	6,761,838	93,195,538	4,963,265	78,915	295,538,928	3,745

Total Airline Assets Near $1 Billion Mark

THE U. S. SCHEDULED airlines—domestic trunk, local service, international and overseas—showed a substantially improved financial position at the end of the third quarter of 1951 with the industry's total assets nearing the billion dollar mark with $890,000,000, an increase of some $72,000,000 over the same period in 1950.

An analysis of the reports filed with the Civil Aeronautics Board for the year ended September 30, 1951, disclosed that the 45 certificated airlines in operation had total assets of $890,170,248, a gain of 8.8% over the $818,250,898 reported in mid-1950 when 44 companies were operating.

Flight Equipment

The depreciated value of the industry's aircraft at the end of last September was $182,397,726, compared with $181,484,633 as of September 30, 1950. Total flight equipment, including planes, engines, propellers and other flight equipment was valued at $287,536,588, nearly $11,000,000 more than in 1950. Total operating property and equipment increased in value by $16,000,000 to a worth of $365,721,272.

Construction work in progress had reached an amount in excess of $11,000,000 by last September, a reversal of the declining trend of the past three years. Construction was off in 1950 and had fallen to $8,000,000 from a high of $29,559,844 in mid-1947 when the airlines were getting plants into shape following World War II.

The industry's payroll and employment both went up in the 12 months ending September 30, 1951, registering

Airlines' Operating Property and Equipment

Flight Equipment	Depreciated Value End of September, 1951
Aircraft	$182,397,726
Aircraft engines	40,872,710
Aircraft propellers	9,717,876
Aircraft radio equipment	5,419,710
Miscellaneous flight equipment	1,183,422
Flight equipment spare parts assembly	47,344,564
Improvements to leased flight equipment	600,580
Total flight equipment	**$287,536,588**
Other Property and Equipment	
Passenger service equipment	$1,644,519
Hotel, restaurant, and food service equipment	1,098,775
Station communication and meteorological equipment	1,333,165
Hangar shop ramp equipment	12,872,969
Motorized vehicles and equipment	3,773,170
Furniture, fixtures, office equipment	7,309,545
Medical equipment	53,413
Engineering equipment	46,122
Airport, airway lighting equipment	156,290
Storage, distribution equipment	834,395
Miscellaneous ground equipment	1,129,059
Buildings and improvements on land owned	2,850,479
Buildings and improvements on land not owned	25,223,823
Improvements to leased property	7,804,974
Total other property and equipment	**$65,866,913**
Construction Work in Progress	$11,100,109
GRAND TOTAL	**$365,721,272**

gains of 21.5% and 16%, respectively over the preceding 12 month period. Mid-1950 saw 81,070 persons employed by the 44 companies, with annual payroll of $319,840,489, and the average industry wage was $3,945. At the end of September, 1951, employment was 94,357, payroll $388,774,587 and average wage $4,120. This was an increase of 13,287 employes with $68,934,088 added to the payroll. Twelve month gain in average wage was $175. Industry employment for the year was expected to near the 100,000 mark passing the peak 96,544 employed in 1946. Although it has taken five years to reach the post-war high in employment, the payroll has climbed steadily and the average wage has increased substantially.

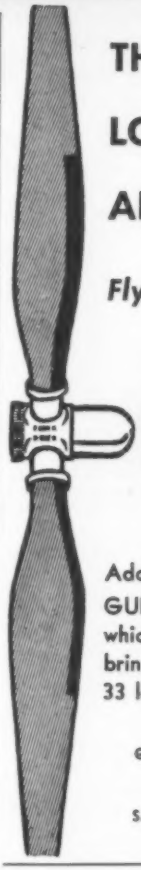
The AMERICAN AVIATION analysis further showed that:

The industry spent $118,164,952 on gasoline and oil for 12 months to September 30, 1951. The oil companies' biggest customer was Pan American World Airways, whose divisions bought $21,766,427 worth of petroleum products. Second largest buyer was American Airlines ($17,986,461) followed by TWA, United Air Lines and Eastern Air Lines.

Passenger food costs for the industry as a whole came to $18,213,250, a shade under $6,000,000 more than in the year before. Expenditures for feeding passengers up for all lines. Monies spent for other passenger supplies came to $4,160,177. American Airlines spent the most for passenger food and supplies, followed by Pan American, TWA and United.

Advertising space purchases amounted to $13,819,377 of the 12 month period, with another $8,876,800 laid out for other types of advertising. Biggest space buyer was Pan American World Airways, whose divisions placed $2,734,373-worth of newspaper and magazine advertising.

Shop and servicing supplies cost the airlines $5,418,898.



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Lake Central Airlines

Financial Profile of the Aircraft Industry

Company	Fiscal Year Ended	Sales	Profit Before Taxes	Profit After Taxes	Profit as % Before Taxes	% of Sales After Taxes	No. of Workers	Annual Payroll	Backlog (firm and negotiating)	Average Annual Wage	Stockholders' Investment	No. of Stockholders'	Return on Investment
Aeronca	12/31/51	$ 5,565,609	$ 831,138	$ 418,246	14.9	7.5	1,097	.....	$ 24,674,000	.....	$ 1,180,846	.....	35.4
Beech	9/30/51	32,797,829	.....	735,484	....	2.2	8,544	.....	185,000,000	.....	8,919,157	.....	8.2—
Bell	12/31/51	82,371,336	4,477,369	1,927,369	5.4	2.3	11,250	45,984,384	369,000,000	$4,089	18,397,462	1,676	10.4
Boeing	12/31/51	337,957,026	.....	7,140,751	....	2.1	47,699	218,000,000	1,355,520,000	.....	57,794,057	.....	12.3—
Cessna	9/30/51	26,548,867	2,019,318	795,144	7.6	2.9	3,146	10,767,000	82,000,000	3,422	6,772,878	2,981	11.7—
Consolidated Vultee	11/30/51	322,157,501	11,550,524	7,750,524	3.6	2.4	52,000	183,744,234	900,000,000	3,883	41,711,847	3,883	18.6—
Curtiss-Wright	12/31/51	176,625,380	14,958,216	6,908,216	8.5	3.9	23,936	.....	1,025,000,000	.....	117,670,566	85,741	5.8
Douglas	11/30/51	225,173,226	18,597,182	6,912,829	8.3	3.1	44,000	142,100,000	1,635,271,000	3,230	81,407,521	8,608	8.5—
Fairchild	12/31/51	74,978,802	6,197,330	2,222,130	8.3	3.0	10,005	32,304,000	249,000,000	.....	19,387,692	10,587	11.4—
Grumman	12/31/51	167,581,568	.....	7,140,751	....	2.1	.....	44,175,989	673,000,000	.....	30,757,085	7,035	17.7
Lockheed	12/31/51	237,230,000	9,842,020	5,793,000	4.1	2.4	39,523	130,124,000	1,510,000,000	.....	55,397,997	10,248	10.4—
Martin	12/31/51	69,236,200	22,519,934†	22,179,934†	....	....	21,500	.....	400,000,000	.....	13,497,544	.....	.....
McDonnell	6/30/51	66,623,014	6,918,262	3,291,262	10.5	5.0	8,226	27,438,060	278,636,137	.....	10,769,854	2,395	30.5
North American	9/30/51	179,443,376	15,221,612	6,421,612	8.5	3.5	32,180	111,000,000	992,000,000	.....	53,913,655	31,694	11.9—
Northrop	7/31/51	89,947,629	3,758,053	3,276,053	4.2	3.6	13,000	40,750,000	255,000,000	.....	.....	2,810	.....
Piasecki	12/31/51	.....	.....	.....	....	....	3,370	12,376,000	150,000,000	3,934	.....	470	.....
Republic	12/31/51	130,440,552	8,082,919	2,934,613	6.2	2.2	18,500	63,530,234	820,000,000	4,807	12,208,540	3,877	24.0—
Ryan	10/31/51	22,277,175	827,604	402,604	3.7	1.8	3,409	11,454,281	41,542,204	3,250	5,217,072	1,150	7.7—
Temco (including Luscombe)	12/31/51	37,278,187	2,038,527	1,131,854	5.4	3.0	7,800	.....	125,000,000	.....	3,186,065	.....	35.5—
United Aircraft	12/31/51	417,211,980	31,256,605	14,266,867	7.5	3.4	43,347	169,036,253	1,300,000,000	.....	132,960,297	37,260	10.7—

* *Breakdowns of Aeroproducts and Allison Divisions of General Motors, Chase Aircraft, General Electric and Westinghouse jet engine divisions unavailable.*
† *(Loss)*

Manufacturers Net Less Than 4% of Sales

Several backlogs are over or near $1 billion, but margins of profit are thinning.

By Robert M. Loebelson

At least five aviation firms had backlogs exceeding the billion-dollar mark when their fiscal year ended, two others have passed the level since that time, another probably has more than $1 billion in aircraft orders, and a ninth is near the magical figure.

Over the Hurdle

Boeing, Curtiss-Wright, Douglas, Lockheed, and United Aircraft all reported military and commercial orders exceeding $1 billion. Consolidated Vultee and North American have passed the hurdle since their fiscal years ended in November and September, respectively. General Electric, which does not break down its figures to account for aviation activities and consequently does not appear in the table, did report it had $1.3 billion in defense orders and most of that amount is for aircraft products. Republic, which reported an $820-million backlog for its F-84 Thunderjet as of December 31, may well move into the billion-dollar class before too many months go by.

The year 1951 saw at least eight aviation firms achieve total sales exceeding $100 million (such companies as Allison, Aeroproducts, GE, and Westinghouse are excluded because figures were not available). Besides the seven firms listed above with billion-dollar orders, Republic and Grumman also cracked the charmed circle.

With one exception every firm in the aircraft industry showed a profit for 1951 but in only two cases did the margin of profit on sales (after taxes) exceed 4%. McDonnell made 5.0% on its sales but one big reason is the fact that its fiscal year ended June 30—before added taxes were making themselves felt. Aeronca netted a 7.5% return on sales in 1951, the first time it had been in the black since 1946. The only reason the return was so high was that Aeronca did not have to pay any income or excess profits taxes as a result of a substantial loss carry-forward from 1948.

The Glenn L. Martin Co. finished its fiscal year with a net loss of $22,179,934, mainly due to its loss on the sale of its 4-0-4 commercial transports.

Employment was at a postwar peak. Of 20 aviation firms reporting on the number of workers, 12 had more than 10,000. Largest aircraft employer was Convair with 52,000 people drawing paychecks. Close behind were Boeing (47,699), Douglas (44,000), United Aircraft (43,347), Lockheed (39,523), North American (32,180), Curtiss-Wright (23,936), and Martin (21,500). These eight companies alone employed more than 300,000 workers.

Yet the size of the company gives no indication of how widely held its stock is. Curtiss-Wright, for example, with a blacklog of $1,025,000,000, has 85,741 stockholders. At the other end of the scale is Piasecki, with 470 stockholders and a backlog exceeding $150 million.

Enlightening Statistics

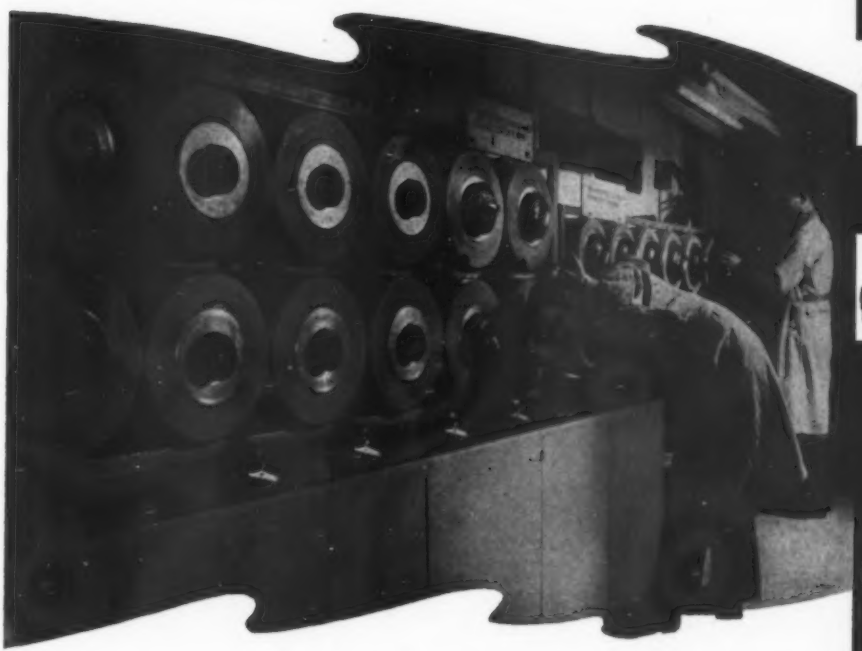
One other enlightening set of statistics is found in the various companies' returns on invested capital. The returns ranged from a low of 5.8% for Curtiss-Wright to highs of more than 35% for Temco and Aeronca.

Still another indication of the rate at which profit margins are thinning is found in a separate report of 29 aircraft and parts companies, who reported a net income after taxes for 1951 of $57,560,000, a 32% drop from 1950. These firms received an average return on their 1951 net assets ($649,451,000) of 8.9% and a 2.2% return on sales. In 1950 their average return on net assets of $592,613,000 was 14.3% and 4.5% on sales.

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- Hamilton Standard
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- McDonnel Aircraft
- North American
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Military Cargo Types Move Into Production

Military production of cargo-type aircraft is still lagging behind bombers and fighters in emphasis, but some new, postwar types are now finding their way into service, and production orders are being let for still newer types.

The Air Force and Navy combined have about 10 new types either in production or in development. Largest is the Air Force's Douglas C-124, a heavy transport powered by four Pratt & Whitney R-4360 engines and capable of hauling a 50,000-pound payload. A turboprop version, the C-124B, is in development and may go into production later.

The USAF has also developed a new version of the Fairchild C-119, the standard troop carrier. Designated the C-119H, the plane is a much larger, longer-ranging version of the familiar Packet. It can carry a 22,000-pound load. Power plants are two Wright R-3350 Turbo-Cyclone compound engines. The "H" will be a production airplane. First flight is scheduled for mid-May.

Chase's C-123 will soon be in production for the Air Force at Kaiser-Frazer Corp.'s Willow Run plant. The C-123 is a twin-engine assault transport with a cargo hold large enough to accommodate a 155mm howitzer and a truck, or 60 fully equipped troops.

Both the Air Force and the Navy are ordering military versions of the Douglas DC-6A. The Navy has already received some of the planes, known as R6D's. The Air Force will call them C-118C's.

Another commercial type, the Convair-Liner, will go into service with the Air Force. Designated C-131A, it will be an evacuation plane for use by Military Air Transport Service.

A new Air Force development is a four-engine turboprop air freighter, the XC-130. Lockheed Aircraft Corp. is now building a prototype, which will be powered by Allison T-38 engines. Indications are that it may become a production model.

The Navy is also ordering Lockheed Super Constellations, to be known as R7V's. Also in the program is a turboprop version of the Super Connie.

For short-haul operations with the Fleet Logistic Air Wings, the Navy is buying R4D-8's, military versions of the Douglas Super DC-3.

Not in production, but a possibility, is a water-based transport, the Convair R3Y. It is a cargo version of Convair's XP5Y-1 flying boat, which is powered by four Allison T-40 turboprop engines.



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WINDOW LIFTS

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Scheduled Air Carrier Aircraft - Domestic

Operator	Douglas				Lockheed					Martin		Boeing	Convair	Total
	DC6	DC4	DC3S	DC3	749	649	049	1049	18	202	404	377	240	
American Airlines	65	8	...	...	...	...	...	...	...	...	...	...	78	151
All American Airways	...	...	...	12	...	...	...	...	...	...	...	...	...	12
Bonanza Air Lines	...	...	...	4	...	...	...	...	...	...	...	...	...	4
Braniff Airways	9	9	...	13	...	...	...	...	...	...	...	...	...	31
Capital Airlines	...	23	3	25	...	...	5	...	...	...	...	...	...	56
Central Airlines	...	...	...	6	...	...	...	...	...	...	...	...	...	6
Chicago & Southen Airlines	...	...	...	12	...	6	...	...	...	...	...	...	...	18
Colonial Airlines	...	4	...	8	...	...	...	...	...	...	...	...	...	12
Continental Airlines	2	1	...	10	...	...	...	...	...	...	...	...	5	18
Delta Air Lines	7	6	...	20	...	...	...	...	...	...	...	...	...	33
Eastern Air Lines	14	...	...	47	20	...	...	11	...	...	16	...	...	108
Empire Air Lines	...	...	...	5	...	...	...	...	...	...	...	...	...	5
Frontier Airlines	...	...	...	12	...	...	...	...	...	...	...	...	...	12
Lake Central Airlines	...	...	...	5	...	...	...	...	...	...	...	...	...	5
Mid-Continent Airlines	...	...	...	23	...	...	...	...	...	...	...	...	4	27
National Airlines	8	6	...	...	...	...	...	...	11	...	...	...	...	25
Northeast Airlines	...	...	...	8	...	...	...	...	...	...	...	...	5	13
Northwest Airlines	...	23	...	4	...	...	...	...	...	...	...	10	...	37
Ozark Air Lines	...	...	...	8	...	...	...	...	...	...	...	...	...	8
Piedmont Aviation	...	...	...	10	...	...	...	...	...	...	...	...	...	10
Pioneer Air Lines	...	...	...	11	...	...	...	...	...	...	...	...	...	11
Robinson Airlines	...	...	...	6	...	...	...	...	...	...	...	...	...	6
Southern Airways	...	...	...	10	...	...	...	...	...	...	...	...	...	10
Southwest Airways	...	...	...	10	...	...	...	...	...	...	...	...	...	10
Trans-Texas Airways	...	...	...	10	...	...	...	...	...	...	...	...	...	10
T. W. A. (Domestic)	...	13	...	44	36	...	29	...	...	12	12	...	...	146
United Air Lines	55	23	...	55	...	...	...	...	...	...	...	6	...	139
West Coast Airlines	...	...	...	6	...	...	...	...	...	...	...	...	...	6
Western Air Lines	...	5	...	6	...	...	...	...	...	...	...	...	10	21
Inland Air Lines*	...	...	...	4	...	...	...	...	...	...	...	...	...	4
Wisconsin Central	...	...	...	6	...	...	...	...	...	...	...	...	...	6
Trunk & Feeder TOTAL	146†	135	3	400	56	6	34	11	11	12	28	16	102	960

* *Subsidiary of Western Airlines.*

† *Includes 29 DC-6B's (AAL 17 & UAL 12)*

Scheduled Air Carrier Aircraft - Special Service, Domestic

Operator	Douglas				Lockheed					Martin		Boeing	Convair	Curtiss	Sikorsky	Misc.		Total
	DC6	DC4	DC3S	DC3	749	649	049	1049	18	202	404	377	240	C46	S51	Bell B47D	190	T50	
HELICOPTERS																			
Helicopter Air Service	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	6
Los Angeles Airways	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	..	3
CARGO ONLY																			
Flying Tiger Line	..	11	..	..	..	..	..	..	..	..	..	..	..	22	..	..	..	..	33
Riddle Aviation Co.	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	6
Slick Airways, Inc.	3‡	..	..	..	..	..	..	..	..	..	..	..	..	21	..	..	..	..	24
U. S. Airlines	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	..	..	..	6
LOCAL AREAS																			
Mid-West Airlines, Inc.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6	..	6
E. W. Wiggins Airways	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	5	5
INTRASTATE*																			
California Cent. Airlines	..	2	..	4	..	..	..	..	..	5	..	..	..	..	..	..	..	..	11
Friedkin Aeronautics, Inc.	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3
Stewart Air Service†	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2
TOTAL	3	13	0	9	0	0	0	0	0	5	0	0	0	55	3	6	6	5	105
Aircraft listed on Trunk & Feeder Certs.	146	134	3	395	56	6	34	11	11	12	28	16	102	0	0	0	0	0	954
Aircraft listed on Helicopters Cargo Only, Local Area & Intrastate Certs.	3	13	0	9	0	0	0	0	0	5	0	0	0	55	3	6	6	5	105
Aircraft listed on all Domestic Certificates	149	147	3	404	56	6	34	11	11	17	28	16	102	55	3	6	6	5	1059

* *Operators certificated under CAR—Part 45, engaged in scheduled intrastate passenger service utilizing Large Aircraft.*

† *Seasonal operation only.*

‡ *(DC-6A).*

Scheduled U. S. Air Carrier Aircraft - International

Operator	Douglas			Lockheed				Martin		Boeing	Convair	Curtiss			Miscellaneous					
	DC6	DC4	DC3	749	649	049	1049	5C	202	377	240	C46	D2	CH300	RC3	G44	G21A	PBY	Total
Alaska Airlines	....	3	4	.....	..	.....	...	..	..	.....	..	§3	..	..	..	..	..	..	10
Alaska Coastal Airlines	....	.....	...	.....	..	.....	...	2	..	.....	..	..	1	1	1	2	5	1	13
American Airlines	*65	*8	...	.....	..	.....	...	..	..	.....	*78	..	..	..	..	..	..	..	151
Braniff Airways	*9	*3	...	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	12
Caribbean Atl. Airlines	....	.....	3	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	3
Chicago & Southern	....	.....	*12	.....	*6	.....	...	..	..	.....	..	..	..	..	..	..	..	..	18
Colonial Airlines	....	*4	*8	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	12
Eastern Air Lines	....	*14	...	*20	..	.....	*11	..	..	.....	..	..	..	..	..	..	..	..	45
Ellis Air Lines	....	.....	...	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	6	..	6
Hawaiian Airlines	....	.....	13	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	13
National Airlines	*8	*6	...	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	14
Northern Cons. Airlines	....	.....	3	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	3
Northwest Airlines	....	*23	...	.....	..	.....	...	..	..	*10	..	..	..	..	..	..	..	..	33
Pacific Northern Airlines	....	2	4	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	6
Panagra	6	4	10	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	20
Pan American-AD	(e)1	(b)30	2	.....	..	(a)18	...	..	..	(c)	..	..	..	..	..	..	..	..	51
Pan American-LAD	(e)	(b)	8	.....	..	(a)	...	..	..	(c)16	14	..	..	..	..	..	..	..	38
Pan American-PAD	....	18	...	.....	..	(a)	...	..	..	13(Cert. 3)	..	..	..	..	..	..	..	..	31
Reeve Aleutian Airways	....	.....	3	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	3
Resort Airlines	....	.....	...	.....	..	.....	...	..	..	.....	..	‡10	..	..	..	..	..	..	10
Trans-Pacific Airlines	....	.....	5	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	5
T. W. A. (International)	....	*2	...	*(d)24	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	26
United Air Lines	*9	*7	...	.....	..	.....	...	..	..	*6	..	..	..	..	..	..	..	..	22
Wien Alaska Airlines	....	.....	2	.....	..	.....	...	..	..	.....	..	..	..	..	..	..	..	..	2
TOTAL	97	124	77	44	6	18	11	2	0	45	92	13	1	1	1	2	11	1	647

* *Also listed on Domestic Certificate.*
‡ *Operated in accordance with Provision Special CAR No. SR-338.*
§ *Operated in accordance with CAR No. SR-368.*

(a) *Listed on Certificates 1, 3 and 6.*
(b) *DC-4 shown on Certificate 1 are also operated on Cert. 6.*
(c) *B-377's shown on Certificate 6 are listed on 1.*
(d) *12 additional L-749's shown on Domestic Certificate No. 17.*
(e) *(DC-6B) Same aircraft listed on Certificates 1 and 6.*

Scheduled U. S. Air Carrier Aircraft - Recapitulation

Type of Operation	Service	DC6	DC4	DC3S	DC3	749	649	049	1049	18	5C	202	404	377	240	C46	D2	S51	B47D	CH300	RB-1	190	T50	G44	G21A	PBY	RC3	247	Total
(1) Sched. Dom.	Aircraft Utilized for Trunk and Feeder Serv. Only	55	68	3	380	12	0	34	0	11	0	12	28	0	24	0	0	0	0	0	0	0	0	0	0	0	0	0	62
(2) Sched. Dom.	Aircraft Utilized for Helicopter Service Only	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	6	0	0	0	0	0	0	0	0	0	
(3) Sched. Dom.	Aircraft Utilized for "Cargo Only" Service	3	13	0	0	0	0	0	0	0	0	0	0	0	0	55	0	0	0	0	0	0	0	0	0	0	0	0	7
(4) Sched. Dom.	Aircraft Utilized for Local Area Service Only	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	5	0	0	0	0	0	1
(5) Sched. Dom.	Aircraft Utilized for Intrastate Service (lg.acft.)	0	0	0	9	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
(6) Sched. Int.	Aircraft Utilized for International Service Only	7	57	0	57	0	0	18	0	0	2	0	0	29	14	13	1	0	0	1	0	0	0	2	11	1	1	0	21
(7) Sched. Dom. & Int.	Aircraft Utilized for Either Domestic or International Service	91	67	0	20	44	6	0	11	0	0	0	0	16	78	0	0	0	0	0	0	0	0	0	0	0	0	0	33
(8) Irreg. Comm. & Int.	Aircraft Utilized in Irregular Air Carrier Service	0	44	0	34	0	0	0	0	0	0	14	0	0	0	79	0	0	0	0	1	0	0	0	0	1	0	1	1
(9) GRAND TOTAL	Air Carrier Acft. in Domestic and Int. Service	156	250	3	500	56	6	52	11	11	2	31	28	45	115	147	1	3	6	1	1	6	5	2	11	2	1	1	14

NOTE: *To find total of scheduled air carrier aircraft in Domestic Services, add 1, 2, 3, 4, 5 and 7. (1065 aircraft).*

To find total of scheduled air carrier aircraft in International Services, add 6 and 7. (547 aircraft).

International Aircraft Designations

Argentina	LV
Australia	VH
Austria	OE
Belgium	OO
Brazil	PP, PT
Burma	XZ, XY
Canada	CF
Ceylon	CY
Chile	CC
China	B
Colombia	HK
Czechoslovakia	OK
Denmark	OY
Dominican Republic	HI
Ecuador	HC
Egypt	SU
El Salvador	YS
Ethiopia	ET
Finland	OH
France	F
Greece	SX
Guatemala	TG
Haiti	HH
Iceland	TF
India	VT
Indonesia	PK
Iran	EP
Iraq	YI
Ireland	EI, EJ
Italy	I
Lebanon	LR
Liberia	EL
Luxembourg	LX
Mexico	XA, XB, XC
Netherlands	PH
Netherlands Antilles	PJ
Surinam	PZ
New Zealand	ZK, ZL, ZM
Nicaragua	AN
Norway	LN
Pakistan	AP
Paraguay	ZP
Peru	OB
Philippine Republic	PI
Poland	SP
Portugal	CS, CR
Saudi Arabia	HZ
Sweden	SE
Switzerland	HB
Syria	YK
Thailand	HS
Turkey	TC
Union of South Africa	ZS, ZT, ZU
United Kingdom	G
Colonies & Protectorates	VP, VQ, VR
United States	N
Uruguay	CX
Venezuela	YV

Irregular Carriers' Aircraft

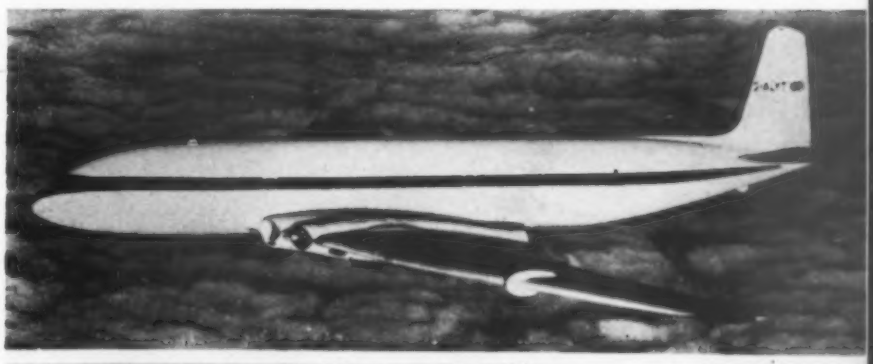
Over 12,500 Pounds

	Type	Date Acq.	Ownership	Lessor
Aero Finance Co.	C-47	6-8-50	Leased	
	C-46	6-8-50	Leased	
Aerovias Sud Americana	C-46	4-16-48	Owned	
	C-46	5-16-51	Leased	
Air Transport Assoc.	C-46	12-15-48	Leased	USAF
	C-46	6-19-48	Leased	USAF
	C-46	6-18-48	Leased	USAF
	C-46	6-25-48	Leased	USAF
All American Airways	C-46	7-12-48	Leased	USAF
American Air Export & Import Co.	C-46	8-9-50	Leased	USAF
	C-46	8-8-50	Leased	USAF
American Air Transport	C-46	4-49	Leased	
	C-46	2-1-51	Leased	
	C-46	11-5-51	Leased	
American Flyers Airline (2)	DC-3's		Leased	
	L-12A		Leased	
Arctic Pacific	C-46	9-29-47	Owned	
	C-46		Interchange	Wien Alaska Airlines
Argonaut Airways Corp.	C-46	11-18-49	Leased	USAF
Arnold Air Service, Inc.	C-46		Owned	
Associated Air Transport	C-46		Leased	USAF
Aviation Corp of Seattle (3)	C-46's		Leased	
Blatz Airlines, Inc.	DC-3	1-2-48	Owned	
Capitol Airways, Inc	DC-3	12-50	Leased	
	DC-3	5-49	Owned	
	C-46	12-49	Leased	
Caribbean American Lines	C-46	1-50	Leased	USAF
	C-46	7-13-51	Leased	Air America
	C-46	8-10-51	Leased	Air America
	C-46	9-7-51	Leased	Air America
	C-46	9-24-51	Leased	Air America
Central Air Transport	C-46	5-4-51	Leased	
	C-54	11-16-51	Leased	
Coastal Cargo Co., Ltd.	C-46	10-15-48	Leased	USAF
	C-46	6-15-49	Leased	USAF
Conner Air Lines	C-46	7-24-49	Leased	USAF
	C-46	10-5-50	Leased	USAF
Continental Charters, Inc.	C-46	10-10-48	Leased	USAF
	C-46	12-1-51	Leased	USAF
	C-46	6-9-49	Leased	USAF
	C-46	1-7-50	Leased	USAF
Economy Airways, Inc.	C-46		Leased	USAF
General Airways, Inc.	DC-3	12-24-46	Owned	
	DC-3	3-13-47	Owned	
Hemisphere Air Transport	DC-3	6-26-51	Leased	Standard Air Line
Meteor Air Transport	DC-3	3-21-46	Owned	
	DC-3	4-1-46	Owned	
	C-46	2-50	Leased	USAF
	C-46	12-51	Leased	USAF
Modern Air Transport	DC-4	8-23-50	Owned	
	C-46	7-16-51	Owned	
	C-46	7-30-51	Owned	
Monarch Air Service (2)	C-46's		Owned	
Overseas Nat. Airways (4)	DC-4's	4-4-47	Leased	
Pearson Alaska, Inc. (Worldwide Airlines)	DC-3	4-1-51	Leased	
Remmert-Werner	DC-3		Leased	
Robin Airlines	C-46	12-11-51	Leased	
	DC-3	10-19-51	Leased	
S. S. W. Inc.	DC-3	10-51	Leased	
Scott Aero Serv., Inc. (2) (U. S. Air Coach)	C-46's			Flying Tiger Line
Southern Air Transport (2)	C-46's	6-49	Leased	USAF
Standard Air Cargo (2)	DC-3's			
Stewart, Edgar A. (2)	DC-3's			
Trans American Airways	DC-4	12-18-51	Leased	20th Cent. Aircraft
Trans Alaskan Airlines	DC-3		Leased	Foreign Y Domestic Enterprise
Trans National Airlines	DC-4		Leased	
	DC-3		Leased	Standard Airlines
Unit Export Co.	C-46	12-48	Leased	USAF
U. S. Overseas Airlines (4)	DC-4's		Leased	
World Airways, Inc. (2)	C-46's	12-48		USAF



56 BOEING STRATOCRUISERS were delivered to the airlines, 45 now being operated by three U. S. airlines. PAA is the biggest operator with a total of 29 Stratocruisers.

Postwar Transport Aircraft





MARK I AND MARK II de Havilland Comet photos provide an opportunity to compare early and new production model. British Overseas Airways Corp. starts operating Comets in scheduled service May 2.

HANDLEY PAGE HERMES, in service with British Overseas Airways Corp., is powered by Bristol Hercules engines and accommodates 63 passengers. It is a descendant of the Hastings military transport.



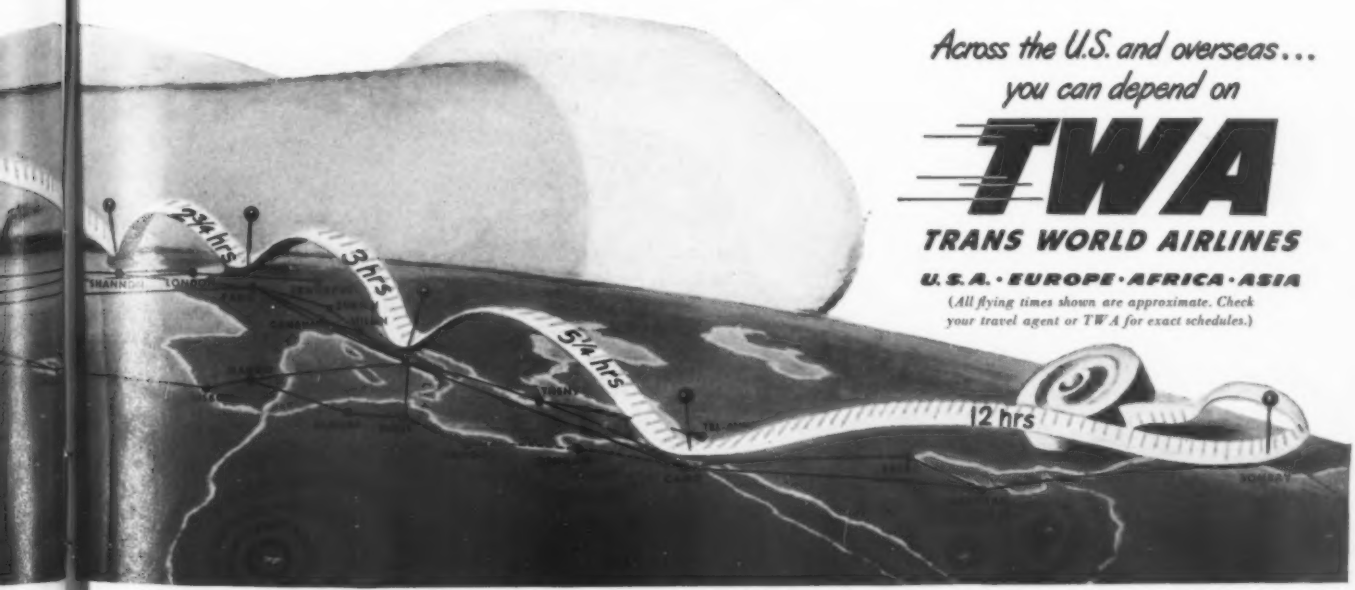
Where in the world can you go on just 2 weeks' vacation?



TWA COAST-TO-COAST SKY TOURIST SERVICE—$99...TWA TRANSATLANTIC SKY TOURIST CONSTELLATIO



Something wonderful happens to those old ideas about distance, when you look at the world this way. Where "too little time" once kept you too close to home, see how far a few *hours* can speed you along TWA's smooth world *high* way. Then imagine the luxurious ease—the carefree, catered-to comfort on your trip by world-proved TWA Constellation. Before *your* dream of a far-off holiday fades, discover how TWA's reasonable fares, including new, low-cost TWA *Sky Tourist* service to Europe, can make the most remote vacation ideas a delightful reality.



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RELATIONS SERVICE FROM NEW YORK TO: LONDON $270—PARIS $290—FRANKFURT $313.10—ZURICH $313.10—ROME $357.20



TWENTY-FIVE Vickers Viscounts, four-engine transports powered by Rolls-Royce Dart turboprop engines, are being put into service by British European Airways, three by Aer Lingus.



45 MARTIN 404's have been delivered with the remaining 56 on order scheduled for delivery this year. TWA and Eastern Air Lines are the two M-404 operators.

Postwar Transport Aircraft



52 DOUGLAS DC-6B's have been delivered to seven airlines and many more are scheduled for delivery during 1952 and 1953.

INTERDICTION....



It's a fine word . . . it describes a great military concept . . . it is the use of air-power to strangle aggressor forces by destroying their supply lines. Interdiction isolates the fighting enemy from his support. ➤➤➤ Greatest effective weapon to wage successfully this phase of warfare . . . as a combat tested, fighter-bomber in Korea, the Thunderjet has proven its ability to carry out the multiple requirements of interdiction.

REPUBLIC AVIATION

FARMINGDALE, LONG ISLAND, N. Y.

Makers of the Mighty Thunderbolt • Thunderjet • XF-91 • F84F



ONLY THREE Douglas Super DC-3's were put into airline operation, these by Capital Airlines, but the U. S. Navy has ordered 100.



SIX BELL 47D helicopters are in service in scheduled mail-carrying operations in the Chicago area.

Postwar Transport Aircraft

174 CONVAIR 240's have been delivered by Consolidated Vultee. Of these, 102 are now in commercial domestic operation by six scheduled airlines.





Planning for the Future— Building for the Present

Bendix Products' position of leadership in fuel metering and landing gear has been attained through its unique ability to plan as well as to produce.

The specialized knowledge of trained engineers and the vast research facilities of Bendix are constantly employed in the development of new and better products.

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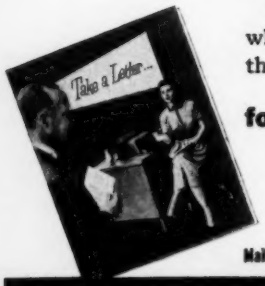
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THREE DOUGLAS DC-6A cargo aircraft have been put in service by Slick Airways; other lines will get 13.

Postwar Transport Aircraft



SIKORSKY S-51 HELICOPTERS, operated by Los Angeles Airways, were the first to be used in the U. S. in scheduled service.



ANCIENT de Havilland sets off sleek lines of modern Connie.



206 LOCKHEED CONSTELLATIONS, including 049's, 649's and 749's, have been delivered to the airlines in post-war years; 114 of these are in scheduled U. S. airline use today by five operators.

Postwar Transport Aircraft



POSSIBLE FORERUNNER OF a commercial turboprop transport is the Convair-Allison Turboliner, basically a Convair 240 modified for Allison T-38 turboprop engines.



OLD STANDBY, the DC-3, still gives service. Some 1,060 are in world-wide use.

TWO ARMAGNACS (SE-2010) on the runway of the SNCASE plant in France



PNEUMATIC - pioneers and leaders in Aircraft Landing Gear



EXPERIENCE KNOW-HOW EQUIPMENT



Cleveland Pneumatic's plant today covers this large area; inset above is a view of the main entrance.



Cleveland Pneumatic's plant in 1928, shortly after landing gear production was started.

Large, modern plant equipped with finest laboratory and manufacturing facilities

Aircraft landing gear and ball-bearing screw actuators are the sole products of this plant comprising approximately six acres of specially designed brick-and-steel buildings. Equipment includes the latest in production tools, testing devices and laboratory facilities.

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Even more important than the physical facilities in the leadership of Cleveland Pneumatic landing gear is our large staff of experienced engineers. Follow our ads for more information regarding the Cleveland Pneumatic story.

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The Bendix Ignition Analyzer actually *foresees the future* by predicting the remaining life of spark plugs. With the Ignition Voltage Control the operator can determine the present efficiency of all spark plugs and put the finger on any weakness in the system—even though it has not yet affected the operation. If the control reveals impending trouble, corrective action may be taken *before* material harm takes place. With an airborne installation of the Ignition Analyzer, the test can be made before an over-water flight reaches the point of no return. By viewing the wave forms on the face of the 'scope and comparing with known patterns, the operator can quickly make the *right* choice . . . to return without mishap, to operate at reduced power and prevent complete engine failure or to continue safely at cruising speed.

So, for maximum safety and operating efficiency it pays to make provisions for installation of a Bendix Ignition Analyzer on all your aircraft.

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Costs Less—Does More

The Bendix Ignition Analyzer is available for either airborne or portable-airborne installations. It can be used with either high or low tension magneto or battery ignition. It is the ignition analyzer that can predict spark plug failure before it occurs . . . make an efficient check of more than one spark plug at a time and do so on a large, easy to read screen . . . yet it costs less than comparable analyzers.

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1951 World Traffic: 39 Million Passengers

Traffic climbed 25% above 1950's Holy Year figures; coach fares seen likely in the future for Europe.

By
SIR WILLIAM P. HILDRED, C.B., O.B.E.
Director General
International Air Transport Assn.

ANYTHING written about international air transport in this spring of 1952 will tend to be preoccupied with the imminent inauguration of the low-cost tourist fares on the North Atlantic. This enterprise, however, should not obscure the record of the industry's solid worldwide accomplishment during 1951—a record which must be set down as the background against which any development like tourist fares should be viewed.


Hildred

Since the present state of world statistical reporting still lends itself better to round figures than to decimally accurate ones, here—in round figures—is what the airlines of the world have done during 1951. The totals do not include the Russians and Chinese, but they do cover the 62 IATA airlines which carry 85% of the world's domestic and international scheduled traffic, and the non-IATA carriers who carry the remainder.

- **They carried** 39 million passengers—an average daily lift of 107,000 people.
- **They performed** 55,923,300 ton-miles of cargo transport.
- **They flew** 149,128,800 ton-miles of airmail.
- **They grossed** approximately $1,700,000,000.
- **They provided** direct employment for more than 200,000 people, of whom about 10 per cent were flight personnel.
- **They served** approximately 750,000 miles of routes and operated between approximately 140 countries and government jurisdictions.
- **They flew** approximately 2,500 aircraft of more than 40 types, including helicopters.
- **They improved** their safety record for the fourth consecutive year by a percentage which is not yet definitely established because not all returns are in.

This was a good record. Total traffic in 1951 was nearly twice the 1947 figure. Despite the inflated demands of Holy Year travel in 1950, the 1951 passenger load was still 25% higher. Cargo increased by 19%, and mail by 15%.

The efficiency of the airlines as transport organizations increased also. This was both necessary and fortunate, for the rising costs of those commodities and services which go into the provision of air transport could be checked only by measures which would keep the unit cost of the ton-mile down. As a result of better procedures and greater utilization, it was possible for airline fares and rates throughout the world to stay constant for the most part and to be reduced in some cases.

In the light of rising costs, however, the 1951 picture contained at least a few shadows. The largest of them, perhaps, was the fear that traffic might not continue to be so dynamically expandable at 1951 fares and standards of service and that costs might push those fares up to the point where traffic might level off or, possibly, even decrease.

This brings us to the real significance of the tourist fares. In the long discussions of these fares in the IATA Traffic Conferences there may have been differences of opinion as to *when* the existing fare structure might reach its point of no return. There was not, however, any substantial disagreement over the fact that if the industry were to continue to expand, it would have to reach a larger market and that this depended almost entirely upon achieving lower fares.

Given these premises, the tourist fare was a logical answer and probably the only one. To plan a tourist fare is one thing; to achieve it is another. It has meant ruthless elimination of every non-essential cost which goes into air transport. First class service will continue for those who want it, and we hope they will always be legion. But tourist fares mean increased seating capacities, narrower aisles, less leg room; plain meals paid for by the passenger, and no extra charge if he wants to bring a bag of sandwiches; no bar; no free ground transport; and lower baggage allowances.

New Market

The necessity to reduce fares to a point where they could cut into a new level of the travel market forced the airlines further to cut all costs. Included in the cut were commissions to agents on tourist services, which were dropped from seven and one half per cent to six per cent. This measure, whose necessity and ultimate justification may not have been fully recognized by the agents themselves, should enable them to drive into an entirely new market.

By every means consonant with proper operation the industry has achieved a notably low tourist fare. In the off-season, it will amount to trans-Atlantic transport at a shade less than

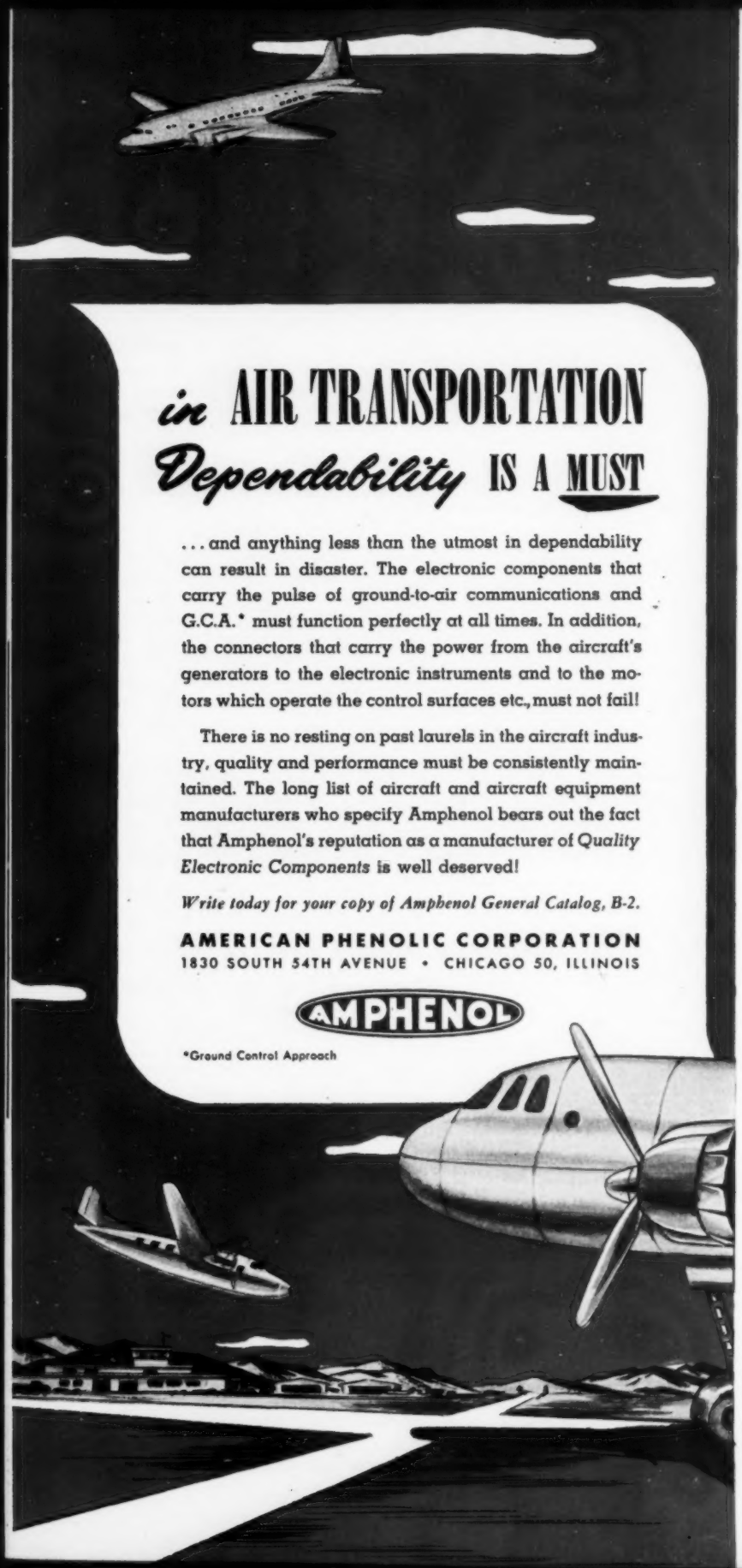
Worldwide Traffic Growth

International and Domestic Scheduled Airlines

Year	Miles Flown	Passengers Carried	Passenger-Miles	Cargo Ton-Miles	Mail Ton-Miles	Average number of passengers per aircraft	Average distance flown per passenger
	millions					(number)	(miles)
1937	167	2.5	885	n. a.	n. a.	5.3	360
1947	718	21.1	11,868	203	90	16.5	562
1948	803	23.6	13,173	314	116	16.4	558
1949	836	26.5	14,478	390	128	17.3	546
1950	890	31.2	16,963	518	143	19.1	544
1951	963	39.0	21,127	616	164	21.9	542
INCREASE OR DECREASE BETWEEN YEARS **Increase in Bold**—Decrease in Light							
1947-48	12%	12%	11%	55%	28%	—	1%
1948-49	4%	12%	10%	24%	11%	6%	2%
1949-50	6%	18%	17%	33%	12%	10%	0.5%
1950-51	8%	25%	25%	19%	15%	15%	0.3%
1937-51	477%	1460%	2286%	n. a.	n. a.	313%	51%
1947-51	34%	85%	78%	203%	82%	33%	4%

Exclusions: USSR: all years
China: 1949-1951

Source: IATA



six cents a mile, within the time limitations of the man or woman with a two- or three-week vacation. On this basis, there is every hope that the airlines can enter a new field of competition—not for a minority with other forms of international transport, but with the more modestly-priced forms of travel affecting a far larger group of people.

When the tourist fare agreement was reached at Nice four months ago, we estimated that the number of passengers the 11 trans-Atlantic airlines might carry from North America to Europe would increase from the 340,000 of 1951 to something around 500,000. Since then, at least several carriers have increased the frequency of their flights to meet strong indications of a greater public response than anticipated. It would be hazardous, even before the new service begins, to make a hard and fast prediction, but I should not be surprised if the number of North Atlantic passengers in 1952 will exceed 500,000. Certainly, it will not take more than a year or two—particularly if American incomes remain in their present balance with inflation—before we equal the 700,000-odd passenger record of the surface carriers.

If the demand continues for any length of time as brisk as it has shown itself so far, it will probably have its repercussions in many other parts of the world. A two-fare system in Europe is already a strong likelihood and it would not be illogical to expect similar developments on the long-line routes which fly east and south out of the European gateways.

Jet Schedules

The coming year will not, however, be devoid of other significance or other problems. For one important thing, it will mark the beginning of regular jet and turboprop transport services, which the entire industry will watch with the greatest of interest. These will underline the necessity for worldwide improvement of air traffic control practices, particularly in the crowded airspace of Europe and around such centers as Idlewild in the U. S.

We can also expect continued experimental activity in helicopter services by airlines in several parts of the world, although any great expansion must still await the development of multi-place rotorcraft.

Certainly we shall have to intensify our own efforts, and those of the governments and manufacturers who share this interest with us, to rationalize and improve the arrangements which surround the "last three minutes of flight." The most vital area of interest in air transport today is the approach and landing process. I hope that the world-

wide discussion of all factors involved in this process by the IATA Technical Conference at Copenhagen beginning May 5 will help substantially to focus on both deficiencies and remedies.

Also in the field of operations and techniques, 1952 will see the airlines getting into the changeover from the present air-ground communication frequencies to the ones newly allotted to aviation by the International Telecommunications Union. It will be a patchy and complex process, but the measures already being taken through IATA to encourage a coordination should help us through it without undue trouble.

In the traffic field, the IATA Traffic Conference structure of agreement on fares and rates, duly approved by the interested governments, has now been extended to cover virtually the whole of the international network. It includes many promotional and experimental features to be watched with interest, of which the tourist fare is one. The IATA structure of cargo commodity rates is being constantly improved and expanded. Cargo traffic itself has already replaced airmail as the second largest money-earner for the airlines on an industry basis, and the results of 1952 should continue the trend.

Uniform Procedures

Out of the tangle of documents and procedures of both the airlines and governments, which necessarily surround international transport, I feel we shall achieve more order during 1952. The facilitation campaign should soon go into a new phase based upon further recommendations by the International Civil Aviation Organization's divisional meeting at Buenos Aires last November, and we hope for particular easements in South America. The network of IATA Interline agreements for passenger, baggage, and cargo handling should spread further to link all international carriers with single documentation and single sets of procedures.

The IATA Clearing House in London, which has just celebrated its fifth anniversary with the pleasing discovery that interline traffic can be assumed to have increased threefold in five years, should be able to report definitely this year on the success of its experiments in the use of kilometers, rather than currency, for interline accounting.

Airlines, government agencies, manufacturers, and all the rest of us have the basic common interest of better, cheaper, safer, faster, more efficient service for ever larger numbers of the public. And there is every indication that in 1952, the public using the airlines will be larger and better served than ever before.

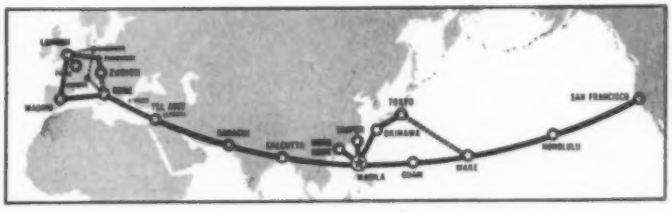


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From San Francisco to the Orient, and onward to Europe — over some 19,000 miles of air routes — travelers along PAL's Route of the *Orient Star* know the meaning of *personalized service*. This is PAL's way of making every passenger feel that to us he is a V. I. P. (Very Important Person).

PAL believes it has an obligation to meet the needs of the traveling public for transportation unsurpassed in comfort, convenience and dependability. PAL personnel are carefully selected and trained with but one objective — to meet those needs in a courteous and efficient manner. By this means PAL is helping to promote the good will and confidence so necessary for the continued advancement of international air travel.

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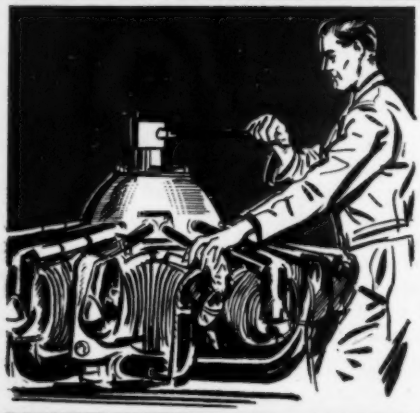




Photo shows front of one of the three Test Blocks.

SPARTAN'S new Engine Overhaul Building will soon be completed. This will enable us to handle the overhaul of any military or commercial engine faster and with greater efficiency. This building is 120 feet by 360 feet and will have 3 assembly lines with conveyors for transporting engine parts through different departments and moving the assembly lines. New type cleaning equipment is being installed which will speed up the flow of work through the shop. A Fulmer Vertical Hone for reconditioning cylinder barrels, honing cases, etc., and many additional new special tools and machines have been added for servicing and overhauling all types of engines. There will also be a new Propeller Shop.

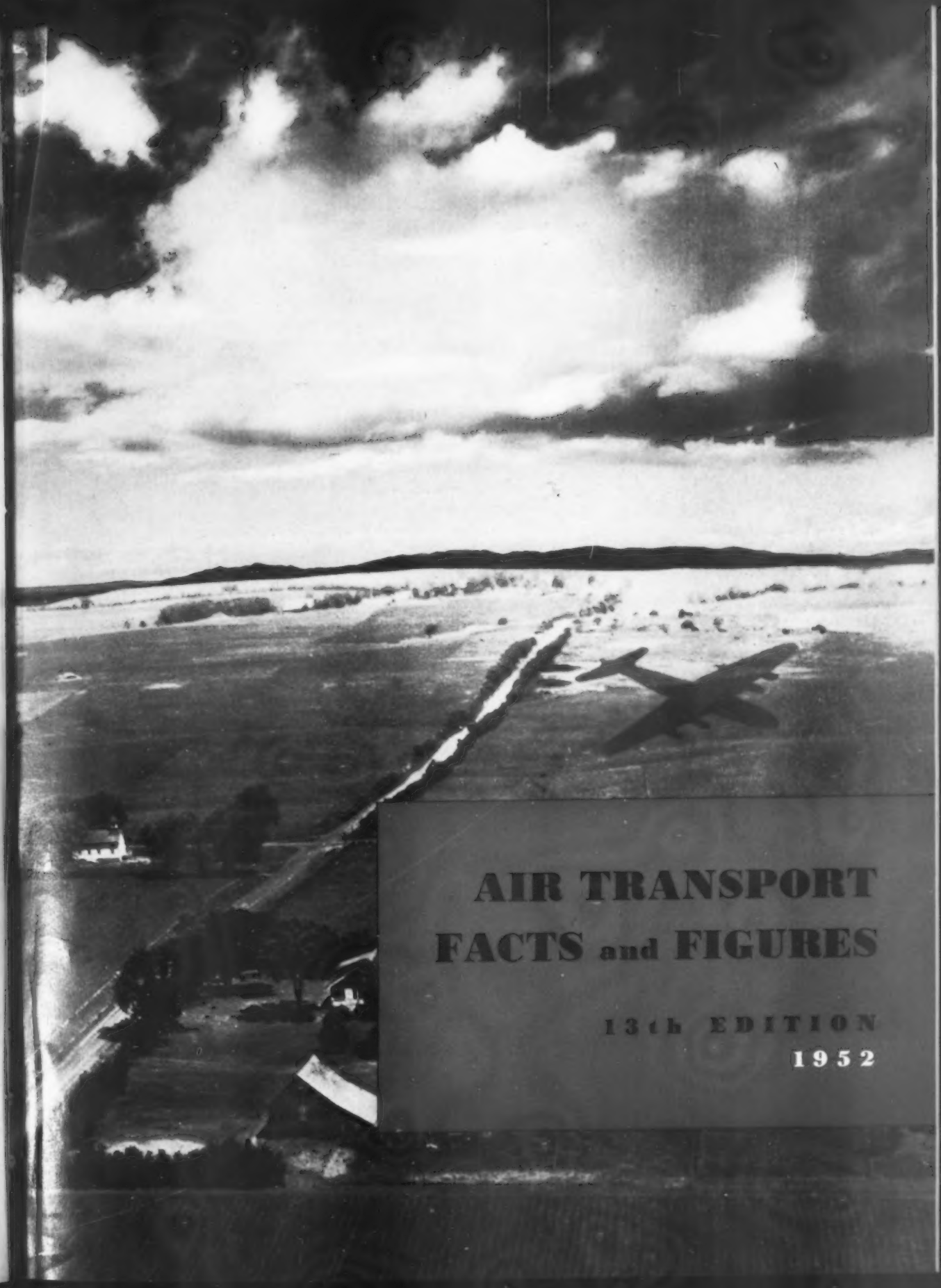
Three Test Blocks have been rebuilt and enlarged at SPARTAN. This will permit the running of three engines at a time; from 100 HP to Pratt & Whitney 2800's or Wright 3350 engines. Other latest equipment and accessories installed include fuel flow meters and meters for recording the flow as well as the consumption of lubricating oils.

SPARTAN cordially invites you to see these new facilities at your earliest convenience. . . If you are a regular SPARTAN customer, you will be pleased with the additional speed and efficiency with which your work will be accomplished. If you are not a SPARTAN customer, now is the time to let us show you how we can save you time and money in the repair, overhaul or conversion of any plane from a Piper Cub to a Constellation. *Wire, write or fly in for complete information about how SPARTAN can serve you.*

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AERO REPAIR



AIR TRANSPORT FACTS and FIGURES

13th EDITION

1952

Continued Growth of Scheduled Airlines Due to Safety, Economy, and Dependability



Emory Scott Land, Vice Admiral, U.S.N. (Retired), is president of the Air Transport Association of America. He served in the Navy from his graduation from Annapolis in 1902, until 1937, when he became a member of the U.S. Maritime Commission. He was designated Chairman of the Commission in 1938 and also served as War Shipping Administrator during World War II. During his Naval service, he was Assistant Chief of the Bureau of Aeronautics. He became a pilot at the age of 50 and devoted eighteen months' time to the Daniel Guggenheim Fund for the promotion of Aeronautics.

BELIEVING that the best air transport service can be brought to the public through joint action and a united front, the scheduled airlines of the United States established the Air Transport Association 16 years ago.

Through this organization, then as now, the scheduled airlines strive to provide the public with the utmost flying safety at the minimum cost with the maximum dependability.

Through ATA the efforts of eight government and four private agencies concerned with aviation are welded into unified action for the benefit of the traveling public, the Postal Service, and the National Defense. For example, in the course of a typical year, one ATA employee working on aids and techniques designed to insure safe, all-weather flying to airline passengers, contacts an average of 235 members of the scheduled airlines, 222 representatives of government and 126 individuals connected with related industries. Such concentrated effort has resulted in a system of operational regularity which delivers passengers, mail and cargo safely and with minimum delay due to weather.

Since hostilities in the Pacific began, ATA has been responsible for coordinating the allocation of scheduled airline planes to the Korean Airlift. Through the Military Bureau of the Air Transport Association, military movements are expedited domestically over the routes of the member airlines. This means that troops back from the Korean front can reach their homes in the shortest possible time.

Through special committees within the framework of ATA, composed of airline and ATA representatives, the scheduled airlines are continuously working on such problems as reducing noise; improving passenger service; better baggage control; speeding of airmail and air parcel post; development of air terminals; cutting visa, passport and customs red tape; standard design specifications for aircraft and aircraft equipment; and improvement of ground equipment.

That the public has accepted the safe, economical, and expedient services which the scheduled airlines provide, is proved by the record which the industry has achieved to date.

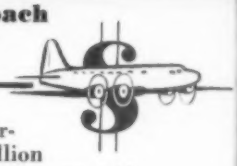
A national transportation policy should be based briefly and simply on three words: Safety, Economics, and Stability.

Emory S. Land President

Air Transport Association of America

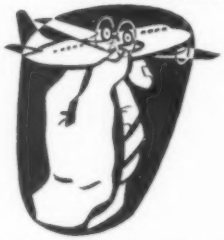
HIGHLIGHTS of SCHEDULED AIR TRANSPORT

Scheduled Airlines Approach Billion Dollar Business



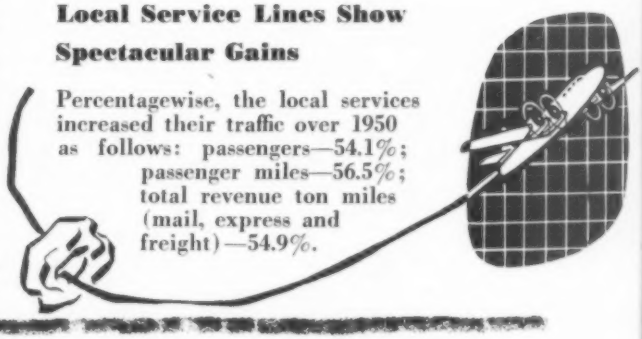
During 1951, the scheduled airlines flew more than 24½ million domestic and international passengers over 13 billion passenger miles—a 28.6% increase in passenger mileage over the previous year. This represents 78.4% of the near billion dollars in revenues received for scheduled airline services.

Nine Times Safer To Fly Today Than in 1931



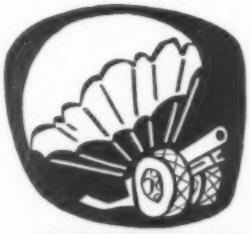
The domestic scheduled airlines have made spectacular safety progress, as shown by comparing the four five-year safety records for the past 20 years; 15, 6.1, 2.4 and 1.7 passenger fatalities per 100 million passenger miles, respectively.

Local Service Lines Show Spectacular Gains



Percentagewise, the local services increased their traffic over 1950 as follows: passengers—54.1%; passenger miles—56.5%; total revenue ton miles (mail, express and freight)—54.9%.

Speeding America's First Line of Defense



By serving the factories producing vital supplies for the military, the scheduled airlines shortened during 1951 America's first line of defense—the production line. Essential supplies are flown where needed in the shortest possible time.

Noise Reduction An Important Airline Target



The reduction of noise in communities adjacent to airports was a prime concern of the airlines during 1951, with noise abatement committees formed to combat the problem. Such activities are high on the industry's agenda of "musts" and will be continued throughout 1952.

Smaller World For More People



The Civil Aeronautics Board's approval of international air coach service, scheduled to go into effect in May, 1952, will reduce the cost of travel to Europe 30% below present first-class fares.

Fares Cut In Half



A quarter-century ago the average airline fare was 12c per passenger-mile. By 1951 the cost per passenger-mile had dropped about 55%—to 5½c, and for air coach or tourist service the air traveler pays only 4¾c per passenger-mile.

Air Mail Rates to Post Office Drop 38-½ Percent



Though the domestic trunk lines flew about 37% more mail than in 1950, airline mail revenues were down 16%. This was due to heavy reductions in air mail rates—from 99.99c to 61.5c per ton mile.

Scheduled Airlines' Military Bureau Aids National Defense



During the two years of its existence, the Military Bureau of the scheduled airlines has operated over 8,000 commercial air movements for the military, transporting nearly a quarter of a million military personnel.

TRAFFIC



Scheduled Airlines Celebrate Silver Anniversary

The year 1951 celebrated the 25th anniversary of scheduled air transportation in the United States. It was a year during which the scheduled airlines flew nearly 12 times as many passengers in a single day as they flew during the entire year 1926. It was a year when more than 24½ million domestic and international passengers bought tickets on the scheduled airlines. They flew more than 13 billion passenger-miles. (A passenger-mile is one passenger traveling one mile.) This was a 29 percent increase in passenger mileage above 1950.

Mail ton miles jumped to approximately 86 million, for a gain of 27 percent above 1950. (A ton-mile is one ton carried one mile.)

The combined express and freight flown by the scheduled airlines in 1951 amounted to nearly 213 million ton-miles. This represented a 0.5 percent gain in ton-mileage above the previous year.

These achievements have been due to the scheduled airlines' continuous improvement in safety, speed and dependability during the past quarter of a century.

Scheduled Air Coach or Tourist Travel

The growth of scheduled air coach or tourist travel was among the outstanding accomplishments of the scheduled airlines during 1951. At the end of the year the nine scheduled domestic carriers offering coach or tourist service were operating 64 daily flights between 34 cities. Air coach, together with family fare and excursion traffic, equalled more than 12 percent of the total passenger volume in 1951. Present plans of the scheduled carriers for increasing air coach or tourist service give promise of a still wider public distribution of the benefits of air transportation.

International Air Tourist Travel

May 1, 1952 will see the inauguration by the scheduled airlines of transatlantic air coach or tourist service. The fares for this class of travel will be 30 percent below present first class fares. This low fare service will make possible a two weeks vacation in foreign lands for thousands of Americans heretofore unable to travel so far in so short a time. The U. S. scheduled airlines have for some time been providing travel at tourist rates to Bermuda and to most of the countries of Latin America.

Major Cities Become Suburbs

1951 marked the inauguration of commutation service between New York and Chicago, the two heaviest traffic centers in the United States. This means that it is possible to leave either city in the morning by plane, travel to the other city, transact business, and return to the point of origin the same day. Between these points, the scheduled airlines are offering 63 nonstop flights a day in both directions. This service linking the two largest cities of the U. S. is unmatched anywhere else in the world. Commutation by scheduled air carriers has been in effect for some time between New York and Washington, New York and Boston, and San Francisco and Los Angeles.

Local Service Airlines



The air age has come to "small-city" America on the wings of the local service airlines. Of the 350 cities served by these airlines, a substantial number have populations of as few as 3,000 people. The average distance flown between stops by aircraft in local airline service is about 60 miles.

In 1946, their first full year of operation, the local service lines flew 25,000 passengers 6,812,000 passenger-miles. In 1951 they carried nearly 1,493,000 passengers 294,436,000 passenger-miles, registering gains of 580% in passengers carried and 424% in passenger-miles flown.

The local service airlines now fly routes totaling more than 30,000 miles, stretching from the Atlantic to the Pacific and from Canada to the Gulf. The 18 lines operate 130 planes and employ 3,800 people.

The aircraft used by most of the local service airlines in both their military and civil operations is the ever-reliable DC-3. It is estimated that in addition to the 43 U. S. scheduled airlines using the DC-3, roughly 6,000 of these planes are operating throughout the world. Since a sizeable portion of the U. S. is dependent upon the DC-3 for air transportation, especially for the short-haul operations engaged in by the local service airlines, it can be assumed that the DC-3 will be in scheduled airline service for some time to come.

SAFETY

First and Foremost

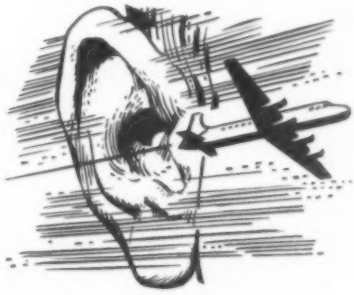


Safety continued to be the major concern of the scheduled airlines during 1951. In a year when there was an average of 12,464 daily takeoffs and landings, the percentage of fatal crashes in total daily operations was roughly 1/10,000 of one percent. Combined domestic and international carriers achieved a safety record of 1.3 fatalities per 100 million passenger miles. This represented the second lowest fatality record for combined domestic and international scheduled air carriers ever to be attained in one year.

Improvement of flying safety begins on the drawing boards of aircraft engineers and designers and continues through stages of development, testing and manufacture to the finished product. Just as safety is engineered into the airplane, the development of sound safety procedures by the Civil Aeronautics Administration, the airlines and the pilots, has converted flying from the romantic venture of old to a safe routine today. The continuing emphasis on safety continues well beyond the production and operation of the plane itself. Daily inspection and extra efforts and extra steps throughout overhaul operations make doubly sure the scheduled airliner will perform at peak efficiency.

NOISE

Price of Progress



Scheduled air transport is a vital part of the nation's transportation system. Admittedly, aircraft do make noise, as do other modes of transportation. Often the noise of aircraft is disturbing to those living in areas of air traffic density. The noise of trains and motor vehicles is also a source of disturbance to those living near railroads and highways. However, this same noise means power, and power means speed—speed to serve the nation in terms of the tempo of contemporary living.

The degree of noise disturbance in an area may frequently depend upon the plane creating the noise. During World War II, the strange, uneven sound of Japanese airplanes overhead was highly distasteful, while an equal racket by our own planes was soothing and reassuring. In other words, the noise of our own aircraft is a reminder that they are ready to move into action in an emergency.

That noise is an integral part of 20th century living does not mean that the scheduled airlines are not trying to reduce their share of it. Whenever possible, special airport runways are used, designed to carry air traffic away from heavily populated areas. Since wind is an important safety factor in the takeoff and landing of aircraft, these runways are used only if crosswind velocity is 15 MPH or less. Also, airports away from heavily populated communities are used by the scheduled airlines when practic-

able for training, testing and other activities which would create noise in sensitive areas. While observing every feature consistent with safety, the scheduled airlines are striving to alleviate the noise problem which confronts those living in today's world.



The growing realization by the traveling public of the sound safety record achieved by the scheduled airlines, and the constant improvement in passenger service and airline equipment are reflected not only in the number of airline passengers, but also in the industry's revenues for 1951, which registered 21 percent over the previous year. However, of the $121 million in net operating income (before taxes) received in 1951, about one half was required for payment of Federal income taxes. In addition, the scheduled airlines collected for the Federal Government approximately $67 million in transportation taxes during the year.

Air Mail Revenues

Although the volume of air mail flown by the scheduled airlines increased 27 percent in 1951, the revenues received for this service were below that of 1950. This was due to the lowering of the average rate of mail payments per ton-mile for the trunk lines from $1.00 in 1950, to approximately 60c per ton-mile in 1951. For example, the 16 domestic trunk lines received almost $39 million in mail revenues in 1951, as against almost $46.5 million in 1950, despite an increase in volume of mail flown from 46 million ton-miles in 1950 to 63 million ton-miles in 1951. Today, 5 percent of the scheduled airline revenue comes from mail. In 1938 it was 37 percent. Major revenue today comes from passenger traffic, which in 1951 represented 86 percent of the total revenues.

One of Today's Best Purchases

The cost of air travel to the public has been greatly reduced since 1926. In that year, the average fare was 12c per passenger mile, and the average speed of aircraft in scheduled service was 90 miles per hour. Today in modern aircraft at speeds averaging 200 miles per hour, the average fare per passenger mile is about 5½c, and air coach or tourist service costs the traveller only 4¾c per passenger mile.

It is noteworthy that the reduction of air rates has been accompanied by an immeasurably improved quality of air travel—in comfort, in speed, in service and in scheduling. That's a solid contribution to the American standard of living. The reason lies primarily in the safe, modern, and efficient aircraft flown by the scheduled airlines today, and to the economies which the airlines have been able to bring to their activities through expert management.





The spectacular event of 1951, as of 1950, was the contribution of the scheduled airlines to the Pacific Airlift. Since the hostilities in Korea began, they have supported the military in this vital activity. They have provided the Military Air Transport Service with from 35 to 40 of their long-range four-engine equipment for the purpose of speeding men and essential supplies to Korea and of evacuating civilians and wounded on return flights.

"Operation Pacific," as this movement is called, is substantially another Berlin Airlift. It is a team of thousands of airline personnel working together in a 24 hour round-the-clock operation. Up to the end of 1951, the scheduled air carriers engaged in Pacific airlift operations flew 110,000 passengers and 14,800 tons of cargo to and from Japan.

Complementing domestically the military airlift to Korea, the scheduled air carriers in civilian service flew during 1951 more than 50,000 military personnel every month. A substantial amount of this traffic was carried by the local service airlines between military centers and the smaller military installations throughout the United States.

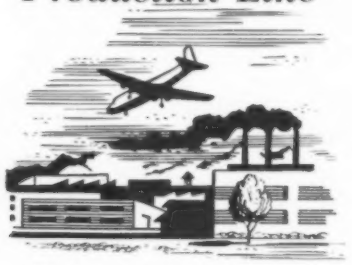
Present Day Strength



At the time of Pearl Harbor, the scheduled airlines had 359 twin-engine transport aircraft operating in their domestic fleet and 27 multi-engine flying boats operating internationally.

At the end of 1951, the scheduled air fleet numbered more than 1,080 transport aircraft, of which 500 were four-engine types and a substantial number of the balance are large, post-war twin-engine types. And what is more, the four-engine planes have far greater speed and four times the lift capacity of the pre-war twin-engine types; the number of available seats has jumped from 6,734 at the time of Pearl Harbor to 41,318 today. This means that in 1941 the scheduled airline fleet had a transport potential of 32 million ton-miles per month. Today their emergency potential is 294 million ton-miles per month, or translated into passenger miles, a potential of 2,679 million per month.

Shortening the Production Line



Today it is generally recognized that business and industry are geared to the tempo of air transportation. It is recognized, also, that the scarcity of domestic air service during World War II hampered the nation's productive capacity—that the war effort was impeded by a lack of internal air transport. The nation soon learned that war economy, moving at the speed required to supply a modern striking force, demands a highly dependable and rapid system of transport. It discovered that it takes more than bombs and bullets to carry on a war; it takes transport aircraft as well—and plenty of them.

By serving the factories which are producing vital supplies and equipment for the armed forces, the scheduled airlines are expediting America's first line of defense—the production line. In case of an emergency shortage in any one link of the production line, essential supplies are rushed where required in the shortest possible time by using the facilities of air express, air parcel post and air freight. In addition, defense officials, military planners, and key suppliers, by using scheduled air transportation, save countless precious hours every month, thus speeding up the entire defense program.

Air Transport in a Crisis



The Department of Defense is fully aware of the value of the passenger and cargo capacity of the scheduled airlines in a crisis. Its mobilization planning includes the use of the airline fleet for immediate conversion to supplement military transportation and for the continued support of the commerce of the United States.

Moreover, under the new terms of the transportation agreement between the military agencies and the scheduled airlines, executed in July of 1951, no preference will be given to any particular form of transportation in covering the handling of military traffic. In the past, the railroads were given a preference in this matter. The new agreement means that the military transportation officers may designate the form of transportation best suited to effecting a given military movement.

Scheduled Airlines Military Bureau



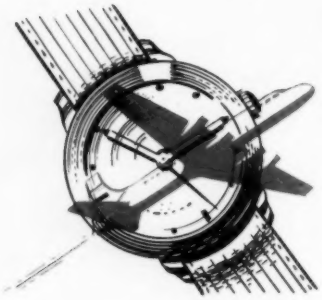
The Military Bureau of the scheduled airlines, established at the end of 1949 for the purpose of moving groups of military personnel domestically, now has a pool of more than 40 twin-engine and four-engine transports at its disposal at all times. These planes operate on a charter basis—that is, they are not on regular schedules, but are set up to accommodate military movements exclusively. The fact that the airlines have allocated to the Bureau this many planes at a time when they are frequently taxed to muster sufficient lift to handle their regular schedules is a solid indication of the scheduled airlines' views as to the efficiency of the Bureau in the procurement and handling of movements of military personnel by air.

Increased Military Air Moves



For the 12 month period from July 1, 1950 through June 30, 1951, 139,289 passengers and 3,394,238 pounds of cargo were carried through the Bureau. In the four months from July through October of 1951, the Bureau moved 60,655 military passengers, an increase on a monthly basis of 31 percent over the earlier period.

Saving Time and Money



One of the significant aspects of the Bureau's activities is the fact that it has demonstrated to the military that movements of several hundred men, long regarded only in terms of train or shipload, can easily be moved by air at a considerable saving of time and money to the Federal Government.

The largest movement handled by the Bureau to date involved nearly 3,000 men, while single movements of 300 or more military personnel are now routine. Recently, 542 Korean returnees disembarked from a troop ship at Oakland, California, and moved by air that same day to Camp Kilmer, New Jersey. This kind of activity is winning transportation officers to the view that it is inexpensive, expedient and efficient to move military personnel by air, to say nothing of the morale factor involved in getting military personnel back home as quickly as possible.

PERSONNEL



Employment in the scheduled air transport industry at the end of 1951 was 232 percent greater than the 26,458 employed by the scheduled airlines at the time of Pearl Harbor and 6 percent above the number employed in 1950.

AIR TRANSPORTATION COMES OF AGE



In the best tradition of national enterprise, the first 25 years of U. S. scheduled air transportation have seen a new industry come of age. The next 25 years should see commercial air transport becoming even more useful, more productive and a more important force in the daily social and economic life of people everywhere, and also a more vital factor in national defense.

The story of air transportation to date does not relate the achievements of the scheduled airlines alone. Congress, the Civil Aeronautics Board, the Civil Aeronautics Administration, the Post Office Department, the traveling public, and private investors have all cooperated towards building the finest system of air transport in the world.



SCHEDULED AIR TRANSPORTATION GROWTH

On the following pages are statistical tables showing the growth of the scheduled air transportation industry in the U. S. in recent years. The statistics depict the ever-growing importance of safe, fast, and economical air transportation in U. S. trade and travel at home and abroad. These tables are proof of the keenness and vision of the Congress which wrote the Civil Aeronautics Act of 1938 and under which the scheduled air transportation industry has been developed.

	Page
Aircraft Operations at CAA Operated Towers	18
Aircraft Utilization	19
Airline Points Certified	18
Airports By Classes	18
Air Mail	
Miles and Payments	13
Revenue and Payments	13
Ton Miles Flown Monthly	14
Expenses	
Total Airline Operating Expenses	16
Direct Aircraft Operating Expenses	16
Financial	
Airline Earning Record	9
Assets and Liabilities—Domestic Trunk Lines	14
Net Operating Income Before Taxes	14
Operating Revenue By Class of Traffic	15
Fuel Consumption	19
Personnel Employed	15
Route Mileages	18
Safety	
Comparative Transportation Safety Record	17
Passenger Fatalities — Scheduled Airlines	17
Traffic	
Average Passenger Fare and Length of Trip	12
First Class Travel Market—Air Penetration	11
Intercity Passenger Miles by Type of Carrier	9
Passenger-miles by Months	12
Passengers Carried Monthly	12
Planes, Seats, Miles	10
Traffic Statistics by Class of Traffic	11



INTERCITY PASSENGER MILES by Common Carriers and Private Automobile

	Millions of Passenger Miles							
	1944	1945	1946	1947	1948	1949	1950	1951
Pullman and Air Travel								
Rail Pullman	26,944	26,912	19,801	12,261	11,015	9,349	9,338	10,226
Domestic Trunklines	2,264	3,336	5,903	6,016	5,840	6,570	7,767	10,216
Local Service Airlines	.....	1	7	46	88	135	189	295
Pullman and Airlines Comb.	29,208	30,249	25,711	18,323	16,943	16,054	17,294	20,737
Airline % of this total	7.75	11.03	22.99	33.09	34.99	41.77	46.00	50.69
Other Common Carriers								
Rail Coach	63,288	59,415	39,039	27,665	24,315	20,273	17,441	19,008
Intercity Motor Bus Lines	26,548	26,927	25,576	23,404	23,650	21,200	19,600	21,168
Total	89,836	86,342	64,615	51,069	47,965	41,473	37,041	40,176
Total All Common Carriers	119,044	116,591	90,326	69,392	64,908	57,527	54,335	60,913
Private Intercity Automobile	151,251	179,837	253,570	274,008	287,420	300,101	325,909	355,000
Total Common and Private Carriers	270,295	296,428	343,896	343,400	352,328	357,628	380,244	415,913
Common Carrier % of Total	44.04	39.33	26.27	20.21	18.42	16.09	14.30	14.65
Passenger Mile Per Capita	1,953	2,118	2,432	2,383	2,403	2,398	2,507	2,697

AIRLINES EARNING RECORD



Year	Operating Revenues	Net Operating Income	Federal Income Taxes	Net Income After Taxes	Net Assets	% Net Income to Net Assets
Domestic Airlines [1]						
1946	$317,205,010	($5,014,172)	($ 359,239)	($5,732,544)	$395,982,280	...
1947	364,839,577	(21,359,544)	(6,058,262)	(21,279,375)	448,209,598	...
1948	434,295,383	2,661,108	3,742,924	(5,478,776)	500,507,484	...
1949	486,033,846	24,300,951	7,510,136	11,947,776	504,634,950	2.37
1950	556,366,449	63,176,440	28,050,626	30,246,060	562,967,087	5.37
1951*	520,891,113	82,466,702	42,670,000	38,086,000	654,354,130	5.82
International Airlines						
1946	146,754,102	6,911,256	2,633,893	(4,353,197)	187,356,168	...
1947	209,009,511	(284,001)	651,458	(5,124,630)	163,397,789	...
1948	249,234,199	13,947,216	2,414,858	6,365,492	204,474,252	3.11
1949	274,154,538	21,291,408	1,361,867	7,454,189	195,470,000	3.81
1950	260,131,412	11,808,338	3,605,814	10,025,242	219,069,589	4.58
1951*	214,672,630	17,159,822	5,204,000	12,910,000	224,093,213	5.76
Airline Industry						
1946	463,959,112	1,897,084	2,274,654	(10,085,741)	583,338,448	...
1947	573,849,108	(21,643,545)	(5,406,804)	(26,404,005)	611,607,387	...
1948	683,529,582	16,608,324	6,157,782	886,716	704,981,736	0.13
1949	760,188,384	45,592,359	8,872,003	19,401,965	700,104,950	2.77
1950	816,497,861	74,984,778	31,656,440	40,271,302	782,036,676	5.15
1951*	735,563,743	99,626,524	47,874,000	50,996,000	878,447,343	5.81

[1] Includes domestic trunk, local service and territorial airlines
* First 9 months
( )—denotes loss

PLANES SEATS and MILES

Year	Planes In Service	Average Available (Seats (a)	Route Miles	Revenue Miles Flown in Passenger Service	Daily Average Rev. Miles Flown All Services
	Domestic Trunk Lines [b]				
1941	359	17.54	46,453	133,497,688	369,636
1942	183	17.92	49,297	109,648,081	306,232
1943	211	18.34	54,502	101,238,437	288,858
1944	292	19.05	62,937	133,532,043	380,088
1945	398	19.68	66,466	192,277,954	564,205
1946	635 (c)	25.31	84,358	295,948,953	839,001
1947	645 (c)	30.30	110,144	302,098,464	854,464
1948	764 (c)	33.14	155,541	301,194,517	866,511
1949	778 (c)	36.32	116,371	306,072,766	885,592
1950	802 (c)	40.53	130,806	312,333,906	896,039
1951	821 (c)	41.67	130,906	348,991,283	993,078
	Local Service Airlines				
1945	12	8.92	2,115	278,553	5,012
1946	28	14.07	13,052	1,277,156	9,080
1947	52	18.74	17,226	8,299,228	29,148
1948	77	19.90	23,133	16,279,202	50,194
1949	88	19.98	29,963	23,924,331	68,345
1950	129	18.08	31,071	33,021,511	92,300
1951	130	20.37	28,498	37,102,754	101,655
	Territorial Airlines				
1945	4	21.86	562	1,306,352	4,744
1946	11	23.12	562	2,080,880	7,035
1947	13	23.99	562	2,745,328	8,721
1948	15	24.09	744	3,361,034	9,916
1949	16	24.11	772	3,203,113	9,461
1950	21	28.41	672	3,314,886	9,626
1951	21	24.97	748	3,544,319	10,699
	International Airlines				
1941	83	18.03	x	x	39,480
1942	68	17.73	x	x	51,181
1943	70	17.51	27,211	x	50,569
1944	70	18.48	29,708	x	61,020
1945	97	18.91	38,885	30,860,064	89,339
1946	138	27.21	66,419	57,097,662	162,673
1947	170	35.18	95,503	83,126,087	236,934
1948	199	35.05	105,853	93,919,831	268,639
1949	199	36.60	109,011	99,039,879	286,372
1950	193	42.33	106,401	90,287,239	257,042
1951	193	44.38	239,691	93,210,441	266,928

a.—Obtained by dividing available seat miles by revenue miles flown in passenger service.

b.—Territorial airlines included with trunklines thru 1944.

c.—Number of these aircraft also listed on international certificates as follows: 1946, 22; 1947, 388; 1948, 273; 1949, 285; 1950, 307; 1951, 329.

x—Not available

TRAFFIC STATISTICS



Year	Revenue Passengers	Revenue Passenger Miles (000)	Pass. Load Factor %	Airmail Ton Miles (a)	Express Ton Miles	Freight Ton Miles	Total Rev. Ton Miles (000)
Domestic Trunk Airlines							
1942	3,129,421	1,417,526	72.21	21,166,024	11,901,793	.....	177,099
1943	3,035,755	1,634,135	88.00	36,068,309	15,636,811	.....	218,273
1944	4,045,965	2,264,495	89.38	51,145,402	17,702,932	.....	289,885
1945	6,376,843	3,336,278	88.16	64,998,094	20,509,753	1,168,534	427,978
1946	11,889,617	5,903,111	78.81	32,867,976	23,651,666	14,433,101	650,054
1947	12,279,016	6,016,257	65.67	32,878,825	28,533,362	35,213,590	683,360
1948	12,324,038	5,840,195	58.52	37,509,922	29,768,883	70,437,811	703,054
1949	14,021,047	6,570,770	59.03	40,874,188	27,329,361	94,189,591	801,508
1950	15,978,172	7,767,041	62.70	46,314,753	36,538,183	112,860,631	951,475
1951*	20,531,951	10,215,677	70.32	63,321,342	40,945,570	99,224,495	1,196,854
(Figures before 1945 include territorial lines)							
Local Service Airlines							
1946	25,118	6,812	37.92	60,088	24,354	25	688
1947	235,585	46,418	29.85	167,564	117,523	62,039	4,682
1948	425,695	87,934	27.14	361,984	189,550	264,794	9,040
1949	677,817	134,691	28.18	473,886	320,187	435,558	14,197
1950	969,874	188,749	31.51	629,006	622,819	695,844	20,244
1951*	1,493,198	295,436	39.24	794,283	920,897	919,131	31,356
Territorial Airlines							
1946	298,710	38,033	79.04	25,243	112,372	389,199	3,872
1947	375,607	46,833	71.10	39,786	115,774	635,925	4,702
1948	418,372	52,864	65.28	53,490	134,400	581,122	5,145
1949	381,840	47,154	61.06	70,219	124,121	602,834	4,744
1950	398,867	48,035	64.62	65,188	118,033	515,570	4,674
1951*	577,830	69,428	55.64	51,245	99,068	872,090	5,597
International Airlines							
1942	269,345	236,956	75.68	.....	.....	.....	.....
1943	279,402	244,229	79.42	1,990,715	5,088,325	.....	34,352
1944	341,496	310,574	79.37	2,048,150	6,207,137	.....	39,705
1945	475,558	447,968	76.78	3,399,339	8,717,511	.....	60,020
1946	1,041,283	1,100,741	70.85	6,141,461	15,090,468	60,037	136,771
1947	1,359,712	1,810,045	61.90	12,755,998	30,786,465	2,109,948	238,439
1948	1,372,749	1,888,997	57.38	17,202,868	41,581,133	4,011,668	265,428
1949	1,520,067	2,053,998	56.67	19,772,215	49,443,623	6,714,414	297,170
1950	1,676,540	2,206,396	59.66	21,188,090	44,501,521	16,049,809	319,674
1951*	2,030,766	2,552,329	60.88	22,130,497	24,400,868	45,547,733	364,534

(a) Does not include regular mail carried under special contract and foreign mail.
* Partially estimated.

AIR PENETRATION INTO FIRST CLASS DOMESTIC TRAVEL MARKET



Thousands of Passenger Miles

Year	Pullman	Air *	Total	Airline Percentage of Total
1941	9,166,039	1,384,733	10,550,772	13.12
1942	17,852,577	1,417,526	19,270,103	7.36
1943	24,675,279	1,634,135	26,309,414	6.21
1944	26,943,593	2,264,495	29,208,088	7.75
1945	26,912,399	3,337,590	30,249,989	11.03
1946	19,801,007	5,909,923	25,710,930	22.99
1947	12,260,763	6,062,675	18,323,438	33.09
1948	11,014,551	5,928,129	16,942,680	34.99
1949	9,349,319	6,705,461	16,054,780	41.77
1950	9,338,185	7,955,790	17,293,975	46.00
1951	10,225,525	10,511,113	20,736,638	50.69

* 1941—1944 includes Trunk Airlines only.
* 1945—1951 includes Trunk and Local Service Airlines.

AVERAGE PASSENGER FARE AND LENGTH OF TRIP



Year	Average Passenger Fare Per Mile		Average Trip Per Passenger (Miles)	
	Domestic *	International	Domestic *	International
1942	5.28¢	8.85¢	453	880
1943	5.35	7.91	538	874
1944	5.14	7.82	560	909
1945	4.95	8.67	511	942
1946	4.63	8.30	487	1,057
1947	5.05	7.77	474	1,331
1948	5.73	8.01	454	1,376
1949	5.68	7.72	448	1,351
1950	5.55	7.28	461	1,316
1951	5.56	7.14	468	1,257

* 1942-1944 includes Trunk and Territorial Airlines.
* 1945-1951 includes Trunk, Territorial and Local Service Airlines.

AVERAGE MONTHLY REVENUE PASSENGERS CARRIED



Year	Domestic *	International
1935	56,545	9,275
1936	77,640	7,310
1937	82,090	9,360
1938	99,758	9,105
1939	144,563	10,752
1940	233,565	13,551
1941	320,740	19,044
1942	260,785	22,445
1943	252,980	23,284
1944	337,164	28,458
1945	548,021	39,630
1946	1,017,787	86,773
1947	1,074,184	113,309
1948	1,097,342	114,396
1949	1,256,725	126,672
1950	1,445,576	139,712
1951	1,883,582	169,231

* 1935-1944 includes Trunk and Territorial Airlines.
* 1945-1951 includes Trunk, Territorial and Local Service Airlines.

AIRLINE REVENUE PASSENGER MILES BY MONTHS

Thousands of Revenue Passenger Miles

Month	Domestic Airlines *				International Airlines			
	1948	1949	1950	1951	1948	1949	1950	1951
January	402,804	429,935	481,355	742,598	128,117	141,506	134,929	164,038
February	358,414	432,226	479,655	683,196	116,834	134,049	139,421	163,452
March	442,045	533,548	568,162	861,466	135,882	162,288	171,686	207,994
April	484,847	577,853	636,440	860,750	136,400	167,792	166,441	196,454
May	540,945	608,302	684,940	888,380	156,117	175,433	172,011	208,642
June	590,131	676,841	784,870	958,610	183,654	204,760	219,700	247,492
July	562,449	640,735	746,463	949,311	184,058	210,739	235,776	258,157
August	570,899	627,142	775,238	995,394	182,391	203,569	230,454	256,656
September	550,868	634,100	741,795	967,436	188,907	199,149	227,738	259,402
October	536,121	608,837	757,920	952,359	165,639	170,473	185,901	223,259
November	453,660	504,939	640,034	840,837	145,091	136,338	145,916	197,010
December	487,810	478,164	705,953	880,204	165,907	147,902	176,423	169,773
Total	5,980,993	6,752,622	8,002,825	10,580,541	1,888,997	2,053,998	2,206,396	2,552,329

* Includes Trunklines, Territorial and Local Service Airlines

AIR MAIL, Miles and Payments

Fiscal Year	DOMESTIC: Payments Per Plane Mile	DOMESTIC: Pound Miles Per Route Mile	DOMESTIC: Revenue Mail Miles Flown	DOMESTIC: Route Miles Air Mail Service	DOMESTIC: Ton Miles Performed	INTERNATIONAL: Mail Miles Flown	INTERNATIONAL: Payments Per Plane Mile
1940	$.326	492,090	59,236,453	37,943	9,335,693	5,907,124	$2.10
1941	.328	513,579	75,689,839	43,411	11,147,481	8,238,349	1.65
1942	.273	703,768	89,307,567	44,623	15,702,128	8,858,294	1.61
1943	.263	1,246,961	89,963,296	45,304	28,246,170	15,633,483	.36
1944	.264	1,709,302	107,650,804	49,482	42,289,845	19,485,789	.17
1945	.211	2,162,025	166,576,371	56,849	61,454,481	24,275,760	.25
1946	.130	1,772,013	221,724,860	57,377	50,836,388	40,659,256	.37
1947	.088	685,592	314,505,965	102,454	33,737,707	71,065,926	.44
1948	.147	520,526	321,661,655	130,093	33,858,424	91,439,534	.50
1949	.191	531,269	331,245,576	155,314	41,256,760	97,459,137	.62
1950	.190	530,585	339,160,155	158,977	42,175,437	87,809,537	.69
1951	.185	673,013	368,701,749	163,000	54,850,571	80,142,296	.81

AIR MAIL REVENUES AND PAYMENTS



Domestic Airlines

Fiscal Year	Payments to Airlines	Postal Revenues	All Allocated Costs(a)	Net Result For Post Office
1940	19,425,732	19,122,906	28,039,250	— 8,916,344
1941	20,697,220	23,920,465	30,881,839	— 6,961,374
1942	23,473,170	33,417,367	36,508,587	— 3,091,220
1943(b)	23,308,477	62,818,568	44,463,207	+18,355,361
1944	28,401,373	79,412,510	49,881,593	+29,530,917
1945	35,199,255	81,237,389	49,937,041	+31,300,348
1946	28,733,479	68,427,924	49,011,932	+19,415,992
1947	27,636,134	54,356,782	73,341,207	—18,984,425
1948	47,199,140(d)	53,586,950	80,662,381	—27,075,431
1949	63,257,536(d)	65,385,603	102,646,667	—37,261,064
1950	64,596,075(d)	74,120,038	109,621,905	—35,501,867
1951	72,604,687(d)	95,425,704	121,415,073	—25,989,369

International Airlines

1940	12,431,965	5,914,406	14,119,547	— 8,205,141
1941	13,628,695	9,309,793	17,333,961	— 8,024,168
1942	14,298,159	12,015,864	15,736,672	— 3,720,808
1943(b)	5,563,283	28,500,000	24,057,541	+ 4,442,459
1944(c)	3,231,371	51,276,499	30,400,406	+20,876,093
1945	6,021,671	110,675,066	57,652,079	+53,022,987
1946	15,154,600(d)	58,081,237	46,406,545	—11,674,692
1947	31,434,000(d)	21,772,578	33,130,428	—11,357,850
1948	46,164,000(d)	23,815,519	51,571,220	—27,755,701
1949	60,366,000(d)	25,695,375	73,418,670	—47,723,295
1950	60,999,200(d)	27,334,124	78,286,463	—50,952,339
1951	65,030,288(d)	31,306,067	77,992,677	—46,686,610

a—Includes cost of field air mail salaries.

b—No cost ascertainment report for 1943. Expenses are estimates.

c—During war years overseas mail except to South America was carried by Air Transport Command. Sums paid to airlines negligible.

d—Subject to adjustment.

MAIL TON MILES FLOWN MONTHLY



Month	Domestic Carriers *			International Carriers		
	1949	1950	1951	1949	1950	1951
Jan.	3,330,170	3,348,042	4,366,277	1,666,341	1,488,208	1,676,622
Feb.	3,246,336	3,261,453	4,762,517	1,508,587	1,421,187	1,568,467
March	3,677,885	3,740,180	5,187,658	1,686,976	1,692,992	1,926,942
April	3,598,234	3,546,090	4,603,019	1,727,768	1,739,571	1,773,969
May	3,364,766	3,799,008	5,107,722	1,614,049	1,868,096	1,852,599
June	3,274,250	3,554,922	4,883,416	1,550,387	1,679,390	1,647,489
July	2,954,599	3,305,024	4,679,710	1,507,879	1,717,127	1,550,168
Aug.	3,159,737	3,833,651	5,105,261	1,501,344	1,738,268	1,781,106
Sept.	3,137,299	3,820,202	5,005,236	1,442,298	1,651,275	1,776,499
Oct.	3,292,972	4,309,096	5,793,369	1,508,723	1,719,793	1,869,805
Nov.	3,357,811	4,169,324	6,066,092	1,517,056	1,791,063	1,829,949
Dec.	5,024,234	6,321,955	8,606,593	2,540,807	2,681,120	2,876,882
Year	41,418,293	47,008,947	64,166,870	19,772,215	21,188,090	22,130,497

* Includes Trunks, Local Service and Territorial Airlines

NET OPERATING INCOME BEFORE TAXES



Year	Domestic Trunklines		Local Service		International	
	Operating Income	% Gross Operating Revenue	Operating Income	% Gross Operating Revenue	Operating Income	% Gross Operating Revenue
1942	26,544,164	24.54	.....	....	5,646,755	13.82
1943	27,432,557	22.30	.....	....	760,184	2.31
1944	36,406,132	22.62	.....	....	(344,267)	Loss
1945	33,980,336	15.83	.....	....	7,346,290	10.63
1946	(5,228,439)	Loss	(129,372)	Loss	6,911,256	4.71
1947	(20,900,100)	Loss	(620,974)	Loss	(284,001)	Loss
1948	2,075,114	0.50	368,998	2.26	13,947,216	5.59
1949	24,625,337	5.36	(441,086)	Loss	21,291,408	7.77
1950	62,570,632	11.94	592,061	2.12	10,182,921	3.94
1951*	99,304,062	15.10	(47,377)	Loss	21,413,228	7.43

* Partially estimated
( ) Denotes loss

ASSETS and LIABILITIES, Domestic Trunk Airlines

Assets	1940	1948	1949	1950	1951(a)
Current Assets	$36,326,940	$171,859,726	$175,472,186	$204,018,828	$282,719,000
Investments & Special Funds	1,723,787	31,682,820	41,369,075	60,079,378	63,949,000
Flight Equip.—Net	31,585,169	188,351,172	188,619,849	201,620,303	210,773,000
Other Oper. Prop.—Net	.....	59,963,595	61,476,977	58,149,892	61,603,000
Non-oper. Prop.—Net	117,376	5,779,353	2,704,375	1,117,230	663,000
Deferred Charges	2,268,520	16,497,423	15,658,706	16,361,052	10,462,000
Other Assets	537,668	10,106,525	1,640,492	1,194,382	862,000
Total Assets	72,559,460	484,240,614	486,941,660	542,541,065	631,031,000
Liabilities and Net Worth					
Current Liabilities	15,595,279	99,836,921	98,428,787	130,111,887	187,684,000
Long Term Debt	4,262,627	167,403,669	148,017,443	135,842,945	143,253,000
Capital Stock	28,406,962	121,312,622	123,710,057	123,467,063	122,561,000
Capital Surplus	21,165,183	53,428,648	56,289,887	57,499,411	68,240,000
Earned Surplus	1,539,716	12,952,554	35,285,887	64,365,672	54,727,000
Operating Reserves	287,795	2,387,158	3,635,427	3,970,701	5,569,000
Other Liabilities	1,301,898	26,919,042	21,574,172	27,283,386	48,997,000
Total Liabilities	72,559,460	484,240,614	486,941,660	542,541,065	631,031,000
Net Worth	51,182,919	188,684,435	224,135,978	255,289,328	285,796,000

(a) As of Sept. 30, 1951

PERSONNEL EMPLOYED

Year	Pilots and Copilots	Pursers Stewards Stewardesses	Other Flight Personnel	Meteorologists and Dispatchers	Mechanics	Other Hangar and Field Personnel	Ticket Agents and Reservationists Office Employees	All Others	Total
Domestic Airlines*									
1942	2,194	753	112	1,581	9,348	2,969	7,717	2,236	26,910
1943	2,125	845	8	1,685	8,271	3,356	10,973	2,391	29,654
1944	2,879	1,322	11	1,870	7,136	3,509	12,201	2,270	31,198
1945	4,967	2,075	108	2,613	10,844	7,012	19,241	3,453	50,313
1946	5,712	3,342	98	3,577	16,107	10,307	24,626	5,413	69,182
1947	5,034	3,061	181	2,618	15,366	8,409	22,012	2,317	58,998
1948	5,307	3,038	312	2,612	16,428	9,222	21,396	2,101	60,416
1949	5,257	3,199	642	2,497	15,674	9,336	21,136	2,145	59,886
1950	5,785	3,372	776	2,450	15,788	9,822	21,894	2,016	61,903
1951**	6,033	3,873	981	2,425	15,228	10,467	23,328	3,622	65,957
International Airlines									
1942	952	378	129	29	3,534	4,415	3,366	....	12,803
1943	207	147	322	511	2,140	1,835	1,859	2,604	9,625
1944	466	194	266	631	2,827	2,239	3,033	1,753	11,409
1945	930	411	938	864	5,099	2,435	4,663	2,628	17,968
1946	1,508	1,079	1,405	1,454	7,269	2,463	6,961	5,233	27,372
1947	1,603	1,016	1,152	1,211	5,774	3,201	10,679	1,518	26,154
1948	1,619	1,104	1,203	1,049	5,400	2,440	9,749	1,628	24,192
1949	1,586	1,142	960	1,084	3,861	2,338	9,012	1,125	21,108
1950	1,492	1,055	745	953	3,818	2,434	9,244	1,142	20,883
1951**	1,808	1,267	714	1,034	4,321	2,565	9,743	559	22,011

* 1942—1944 includes Trunk and Territorial Airlines.
* 1945—1951 includes Trunk, Territorial and Local Service Airlines.

** As of Sept. 30, 1951.

OPERATING REVENUES, United States Scheduled Airlines

Year	Passenger Revenues	% of Total	Mail	% of Total	Express and Freight	% of Total	Other Revenues	% of Total	Total Revenues
Domestic Trunk Airlines									
1942	74,819,050	69.18	23,446,588	21.68	6,968,357	6.44	2,913,914	2.70	108,147,909
1943	87,481,456	71.13	24,103,190	19.60	8,381,540	6.81	3,029,389	2.46	122,995,575
1944	116,440,690	72.36	33,317,399	20.70	8,306,288	5.16	2,863,848	1.78	160,928,225
1945	166,519,923	77.59	33,557,040	15.64	10,835,140	5.05	3,694,562	1.72	214,606,665
1946	272,573,481	87.39	20,273,557	6.50	13,269,914	4.25	5,776,089	1.85	311,893,041
1947	303,193,780	86.01	23,325,630	6.62	18,888,247	5.36	7,082,711	2.01	352,490,368
1948	334,735,598	80.98	47,837,531	11.57	23,788,568	5.76	6,991,190	1.69	413,352,887
1949	378,113,445	82.24	45,031,010	9.79	27,280,566	5.93	9,357,523	2.04	459,782,544
1950	430,098,393	82.06	46,311,377	8.84	34,266,653	6.54	13,432,191	2.56	524,108,614
1951	568,424,275	86.32	38,960,561	5.92	36,175,591	5.49	14,962,479	2.27	658,522,906
Local Service Airlines									
1946	314,638	16.30	1,558,614	80.71	13,008	0.67	44,797	2.32	1,931,057
1947	2,280,124	26.99	5,957,097	70.51	60,179	0.71	150,931	1.79	8,448,331
1948	4,666,549	28.64	11,282,490	69.25	147,958	0.91	195,512	1.20	16,292,509
1949	7,362,007	33.55	14,054,998	64.06	252,159	1.15	271,465	1.24	21,940,629
1950	10,302,960	36.92	16,400,176	58.76	442,047	1.58	763,619	2.74	27,908,802
1951	16,136,618	45.74	17,747,971	50.31	675,837	1.92	714,806	2.03	35,275,232
International Airlines									
1942	20,970,792	51.31	9,038,810	22.12	4,318,924	10.57	6,541,299	16.00	40,869,825
1943	19,333,389	58.87	3,624,223	11.04	4,401,466	13.40	5,480,095	16.69	32,839,173
1944	24,287,050	62.47	2,889,093	7.43	5,405,470	13.90	6,300,788	16.20	38,882,401
1945	38,858,800	56.23	12,264,219	17.75	7,314,743	10.58	10,673,311	15.44	69,111,073
1946	91,416,767	62.29	25,060,600	17.08	11,413,268	7.78	18,863,467	12.85	146,754,102
1947	140,652,113	67.29	32,299,890	15.45	17,526,276	8.39	18,531,252	8.87	209,009,531
1948	151,337,705	60.72	57,331,556	23.00	20,808,679	8.35	19,756,259	7.93	249,234,199
1949	158,479,705	57.81	75,197,073	27.43	22,126,830	8.07	18,350,930	6.69	274,154,538
1950	160,576,068	62.14	55,689,070	21.55	21,650,391	8.37	20,489,886	7.94	258,405,415
1951*	182,260,245	64.14	54,241,276	19.09	24,671,091	8.68	22,999,516	8.09	284,172,128

* Estimated

TOTAL AIRLINE OPERATING EXPENSES

Year	Aircraft Operating Expenses	% of Total	Ground & Indirect Expenses	% of Total	Total Operating Expenses
Domestic Trunklines					
1943	34,613,411	36.2	60,949,609	63.8	95,563,020
1944	45,150,125	36.3	79,371,967	63.7	124,522,092
1945	69,222,625	38.3	111,403,704	61.7	180,626,329
1946	127,411,526	40.2	189,709,954	59.8	317,121,480
1947	163,202,631	43.7	210,187,837	56.3	373,390,468
1948	189,790,818	46.1	221,486,955	53.9	411,277,773
1949	209,679,522	48.2	225,477,685	51.8	435,157,207
1950	225,237,388	48.8	236,300,592	51.2	461,537,980
1951*	269,684,129	48.3	288,668,105	51.7	558,352,234
Local Service Airlines					
1946	996,175	48.3	1,064,254	51.7	2,060,429
1947	4,462,227	49.2	4,607,078	50.8	9,069,305
1948	8,321,371	52.3	7,602,141	47.7	15,923,512
1949	11,810,777	52.8	10,570,938	47.2	22,381,715
1950	13,898,781	49.6	14,150,445	50.4	28,049,226
1951*	16,930,354	47.7	18,563,050	52.3	35,493,404
International Airlines					
1943	11,991,694	37.4	20,087,295	62.6	32,078,989
1944	13,352,194	34.0	25,874,474	66.0	39,226,668
1945	22,918,033	37.1	38,846,750	62.9	61,764,783
1946	52,465,127	37.5	87,377,719	62.5	139,842,846
1947	93,765,716	44.8	115,527,815	55.2	209,293,531
1948	110,992,589	47.2	124,294,394	52.8	235,286,983
1949	122,333,638	48.4	130,529,491	51.6	252,863,129
1950	122,775,659	49.4	125,547,413	50.6	248,323,072
1951*	130,492,209	48.9	136,363,025	51.1	266,855,234

* Estimated

(Breakdown of Figures in above column "Aircraft Operating Expenses")

DIRECT AIRCRAFT OPERATING EXPENSES

Year	Flying Operations	% of Total Expenses	Direct Maintenance Flight Equipment	% of Total Expenses	Depreciation Flight Equipment	% of Total Expenses
Domestic Trunklines						
1943	20,739,121	21.7	9,132,260	9.6	4,742,030	4.9
1944	28,238,316	22.7	11,892,963	9.6	5,018,845	4.0
1945	43,421,033	24.0	16,392,654	9.1	9,408,938	5.2
1946	69,729,554	22.1	32,490,116	10.2	25,191,856	7.9
1947	85,932,761	23.0	41,029,360	11.0	36,240,510	9.7
1949	104,163,765	25.3	46,093,128	11.2	39,533,925	9.6
1949	119,961,143	27.6	50,270,468	11.6	39,447,911	9.0
1950	132,060,283	28.6	53,747,249	11.6	39,429,856	8.6
1951*	159,688,739	28.6	67,002,268	12.0	42,993,122	7.7
Local Service Airlines						
1946	497,438	24.1	347,727	16.9	151,010	7.3
1947	2,203,155	24.3	1,336,677	14.7	922,395	10.2
1948	4,526,827	28.4	2,338,788	14.8	1,455,756	9.1
1949	6,486,969	29.0	3,280,965	14.6	2,042,843	9.2
1950	8,687,483	31.0	3,594,219	12.8	1,617,079	5.8
1951*	11,180,423	31.5	4,330,195	12.2	1,419,736	4.0
International Airlines						
1943	8,074,416	25.2	2,172,952	6.8	1,744,326	5.4
1944	8,469,557	21.6	3,030,386	7.7	1,852,251	4.7
1945	15,297,599	24.8	5,198,602	8.4	2,421,832	3.9
1946	32,447,634	23.2	11,063,761	7.9	8,953,731	6.4
1947	53,188,662	25.4	21,997,077	10.5	18,579,977	8.9
1948	67,163,026	28.6	24,241,052	10.3	19,588,511	8.3
1949	72,346,828	28.6	26,310,942	10.4	23,675,868	9.4
1950	70,979,949	28.6	26,158,178	10.5	25,637,532	10.3
1951*	76,587,451	28.7	29,354,076	11.6	24,550,682	9.2

* Estimated

PASSENGER FATALITIES, SCHEDULED AIRLINES



Year	Domestic		International		Total	
	No. of Fatalities	Fatalities per 100 Million Pass. Miles	No. of Fatalities	Fatalities per 100 Million Pass. Miles	No. of Fatalities	Fatalities per 100 Million Pass. Miles
1942	55	3.7	0	—	55	3.1
1943	22	1.3	10	3.9	32	1.7
1944	48	2.2	17	5.3	65	2.6
1945	76	2.2	17	3.7	93	2.4
1946	75	1.2	40	3.5	115	1.6
1947	199	3.2	20	1.1	219	2.7
1948	83	1.3	44	1.0	127	1.5
1949	93	1.3	0	—	93	1.0
1950	96	1.1	48	2.1	144	1.3
1951	142	1.3	31	1.2	173	1.3

COMPARATIVE TRANSPORTATION SAFETY RECORD



	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
Domestic Scheduled Air Transport										
Fatalities	55	22	48	76	75	199	83	93	96	142
Rate *	3.7	1.2	2.2	2.2	1.2	3.2	1.3	1.3	1.1	1.3
International Scheduled Air Transport										
Fatalities	0	10	17	17	40	20	44	0	48	31
Rate *	...	3.9	5.3	3.7	3.5	1.1	1.0	...	2.1	1.2
Motor Buses										
Fatalities	x	x	x	120	140	140	120	120	100	x
Rate *	.23	.22	.22	.17	.19	.21	.18	.20	.17	x
Railroad Passenger Trains										
Fatalities	110	262	249	142	116	74	52	32	184	121
Rate *	.20	.30	.26	.16	.18	.16	.13	.09	.58	.41
Passenger Automobiles and Taxicabs										
Fatalities	x	x	x	12,900	15,400	15,300	15,200	15,300	17,600	x
Rate *	2.7	2.7	2.9	2.9	2.5	2.3	2.1	2.0	2.2	x

*—Rate per 100 million passenger miles

x—Not available

NUMBER OF AIRPORTS BY CLASSES

as of December 31 each year

Length of Runways	1941	1946	1947	1948	1949	1950	1951
Class I and under ..... (Unpaved 1800-2700 ft. paved 1800-2500 ft.)	1,523	2,491	3,525	4,006	4,013	4,005	3,869
Class II ..... (Unpaved 2700-3700 ft. paved 2500-3500 ft.)	702	758	845	972	995	964	993
Class III ..... (Unpaved 3700-4700 ft. paved 3500-4500 ft.)	187	485	422	471	475	507	573
Class IV ..... (Unpaved 4700-5700 ft. paved 4500-5500 ft.)	72*	443	314	361	364	376	455
Class V ..... (Unpaved 5700-6700 ft. paved 5500-6500 ft.)	....	313	100	131	133	139	182
Class VI and Over ..... (Unpaved 6700-7700 ft. paved 6055-7500 ft.)	....	....	52	7	73	81	164
Totals	2,484	4,490	5,258	5,820	6,053	6,072	6,236

* Class IV and over
Data covers civil airports only from 1947 thru 1951

AIRCRAFT OPERATIONS AT CAA OPERATED AIRPORT TOWERS

Scheduled Air Carrier
Military—
Other Civil

Year	Number of Flight Operations Total	Military	Civil	Scheduled Air Carrier	% Air Carrier of Total
1945	9,414,524	4,300,002	3,463,659	1,650,863	17.5%
1946	11,926,631	1,370,609	8,198,196	2,357,826	19.8
1947	17,669,617	1,594,520	13,220,616	2,854,481	16.2
1948	18,377,866	2,259,097	12,876,828	3,241,941	17.6
1949	16,939,814	2,780,259	10,446,298	3,713,257	21.9
1950	15,971,152	2,384,325	9,584,880	4,001,947	25.1
1951	17,025,635	2,852,313	9,617,813	4,555,509	26.8

All figures include LaGuardia Airport which was operated by New York City until October 1, 1946 when CAA took over control towers there.

AIRLINE POINTS CERTIFIED AS OF DEC. 31, 1951

	Points In Use	Points Not Served	Total Points Authorized
Trunk Lines exclusively	196	28	224
Local service airlines exclusively	196	178	374
Combination trunk and local service	188	4	192
Cargo exclusively	5	1	6
Total	585	211	796

ROUTE MILEAGES AS OF DECEMBER 31, 1951



DOMESTIC TRUNK	
All American	1,441
American	21,531
Braniff	4,831
Capital	7,372
Catalina	47
Chicago & Southern	6,118
Colonial	1,378
Continental	4,250
Delta	7,578
Eastern	18,307
Hawaiian	374
Inland	1,913
Mid-Continent	6,241
National	2,829
Northeast	2,833
Northwest	11,043
Pan American	38
TWA	15,773
Trans Pacific	374
United	15,806
Western	3,103
Total	133,180
LOCAL SERVICE	
All American	2,100
Bonanza	664
Central	1,361
Empire	754
Frontier	4,817
Helicopter Air	305
Island Air Ferries ..	227
Lake Central	655
L. A. Airways	401
Mid-West	1,280
Ozark	2,406
Piedmont	1,991
Pioneer	1,997
Robinson	563
Southern	2,117
Southwest	1,272
Trans Texas	2,219
West Coast	864
Wiggins	793
Wisconsin Central ..	1,712
Total	28,498
INTERNATIONAL	
Braniff	7,870
Caribbean Atlantic ..	393
Chicago & Southern	3,270
Colonial	2,030
Eastern	917
Northwest	14,984
Pan American	155,763
Pan American—Grace	10,640
TWA	28,023
UMCA	378
Western	1,640
Total	225,908
OVERSEAS (TERRITORIAL)	
Alaska Airlines	1,665
Eastern	2,653
Northwest	2,736
Riddle	2,220
United	2,898
Pacific Northern ...	1,611
Total	13,783
TOTALS	
Total Trunk & Local Service	161,678
Total International and Overseas	239,691
GRAND TOTAL	401,369

AIRCRAFT UTILIZATION, DOMESTIC AIRLINES

Aircraft Type	No. of Engines	1941 No. Planes	1941 Av. Mi. Per Day	1948 No. Planes	1948 Av. Mi. Per Day	1949 No. Planes	1949 Av. Mi. Per Day	1950 No. Planes	1950 Av. Mi. Per Day	1951 No. Planes	1951 Av. Mi. Per Day
Beechcraft	2	—	—	6	648	—	—	—	—	—	—
Boeing											
247-D	2	28	458	—	—	—	—	—	—	—	—
SA-307B	4	5	1,596	5	1,362	5	1,385	5	796	—	—
377	4	—	—	—	—	10	410	10	1,509	16	1,630
Consolidated Vultee											
Convair	2	—	—	69	899	93	853	103	989	102	1,102
Douglas											
DC-2	2	13	650	—	—	—	—	—	—	—	—
DC-3	2	225	1,174	436	1,190	418	1,077	415	966	425	1,014
DST	2	45	1,526	—	—	—	—	—	—	—	—
DC-4	4	—	—	146	1,318	160	958	146	1,299	137	1,614
DC-6	4	—	—	103	1,864	104	1,655	113	1,950	139	2,207
Lockheed											
Electra	2	16	527	6	591	6	—	6	—	—	—
Lodestar	2	13	829	12	335	11	975	11	947	11	1,152
Constellation	4	—	—	36	2,067	55	1,596	86	2,026	101	1,976
Sikorsky	2	5	281	5	191	—	—	—	—	—	—
Stinson											
Single Motor	1	9	262	7	447	—	—	—	—	—	—
Tri-Motor	3	—	—	—	—	—	—	—	—	—	—
Martin											
202	2	—	—	24	859	24	1,255	33	1,120	12	786
404	2	—	—	—	—	—	—	—	—	18	1,089
Curtis 46	2	—	—	2	802	—	—	2	350	—	—

Note: Number of planes are as of Dec. 13 of each year
Includes Domestic Trunk, Local Service and Territorial Airlines

FUEL CONSUMPTION U. S. Domestic and International Air Carriers

Domestic Airlines*

Year	Number of Gallons Gasoline	Oil
1941	81,657,020	1,282,064
1942	68,908,271	1,008,371
1943	65,025,412	894,262
1944	89,513,646	1,266,741
1945	134,824,120	1,709,566
1946	236,388,751	2,876,250
1947	294,196,130	3,733,728
1948	332,423,626	4,250,151
1949	375,283,794	4,702,751
1950	418,441,973	5,006,531
1951	491,774,740	5,287,482

* 1941—1944 includes Trunk and Territorial Airlines.
* 1945—1951 includes Trunk, Territorial and Local Service Airlines.

International Airlines

Year	Number of Gallons Gasoline	Oil
1941	11,302,376	276,454
1942	16,811,959	329,154
1943	13,760,354	242,577
1944	15,648,426	243,836
1945	25,086,866	315,930
1946	59,543,323	767,569
1947	102,723,690	1,224,810
1948	123,402,583	1,296,952
1949	142,813,987	1,662,727
1950	153,804,225	1,668,043
1951	164,232,428	1,686,911

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AMERICAN AVIATION is honored to present the Air Transport Association's 13th Annual Edition of "Facts and Figures" about the U. S. scheduled certificated airlines. These Facts and Figures, assembled by ATA from revised data filed by the carriers with the Civil Aeronautics Board, show significant developments and progress of the air transport industry throughout the years.

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Beechcrafts.. newest kind of ranch and farm "machinery"

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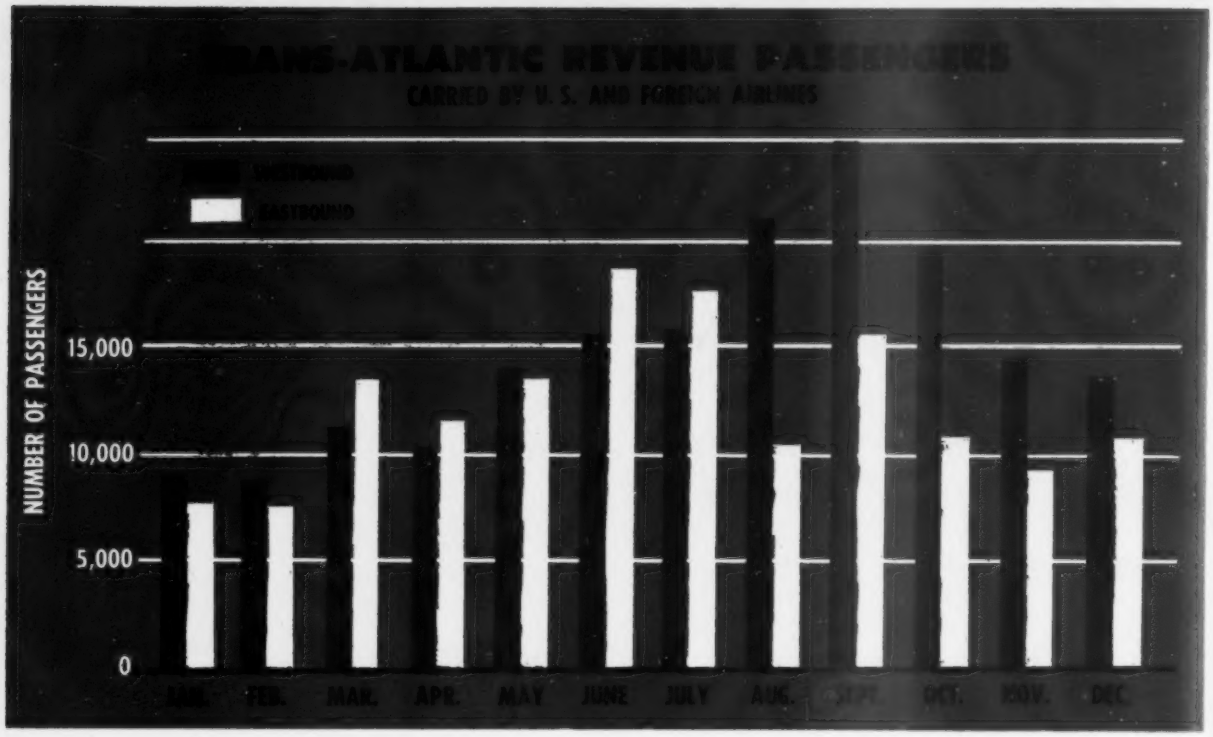




Beechcraft



BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS



Trans-Atlantic Air Travel Up 5.6% in 1951

Compares with 16.7% jump in 1950; U. S. lines' share of business drops to 50.03%.

By Eric Bramley

A TOTAL of 328,764 revenue passengers was carried both ways across the Atlantic in 1951 on the regular schedules of the 11 U. S. and foreign airlines, a 5.6% increase over the 1950 total of 311,150. This compared with a 16.7% increase in 1950 over 1949.

U. S. Got 50%

The total 1951 business was split almost 50-50 between the two U. S. airlines and the nine foreign operators. Pan American World Airways and TWA accounted for 50.07%, with foreign lines handling 49.93%. In 1950 (including operation of American Overseas Airlines for nine months as a separate company), the U. S. percentage was 56.2%, and in 1949, 61.1%.

The U. S. lines in 1951 flew only 46.8% of the trips to get 50.07% of the traffic, while foreign lines flew 53.2% to get 49.93%. In 1950, the three U. S. carriers got 56.2% of the passengers with 52.5% of the schedules.

The statistics show that in 1951 the merged PAA-AOA company did not carry the same percentage of the total Atlantic business as did the separate companies in 1950. In 1950, although it operated separately for only the first nine months, AOA in that time did 12.8% of the total year's business. In the same year, PAA carried 22%, making a total for the two of 34.8%, with 29.7% of the trips.

In 1951, the merged PAA-AOA handled 27.9% of the total traffic with 23.2% of the trips. TWA, which in 1950 carried 21.3% with 22.8% of the trips, last year accounted for 22.1% with 23.6% of the schedules.

Less Military

One reason advanced for the smaller increase in total business between 1950 and 1951 as compared with 1949-50 is that in 1950 the scheduled lines handled a large amount of military business, whereas last year more of this traffic went via military planes.

The total of 328,764 passengers included only those on regular schedules from the U. S. and Canada to European points and beyond. In addition, more than 10,000 people were carried on charter trips.

Two more foreign lines appeared in the Atlantic picture in 1951—El Al Israel Airlines and Linee Aeree Italiane, Italian Airlines.

The 1950-51 comparison shows:

• **The 5.6% increase in passenger traffic** (both ways) was accomplished with a 1.2% increase in trips flown.

• **Airline passenger travel** was 47.7% of the total carried on Atlantic steamships (all classes). This comparison includes air charter passengers and is for the period Dec. 31, 1950, to Dec. 29, 1951. In 1950, air was 45.8% of steamship, and in 1949, 41.8%.

Lead Increased

• **The foreign airlines,** which took the Atlantic cargo lead away from the U. S. carriers in 1950, further increased their lead last year.

• **The first six passenger carriers,** in order, were PAA, TWA, BOAC, KLM, SAS and Air France. In 1950, AOA was third.

• **PAA had the most passengers per flight** (36.9), with BOAC coming in second (36).

• **Among the larger carriers,** BOAC showed the biggest gain—up 41.2% in passengers carried, with a 22.4% jump in trips operated. BOAC's traffic increase in two years has been 169%.

Here's how individual companies fared percentagewise in 1951 as compared with 1950:

You'll feel like royalty when you take the

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● Naturally, the most important thing to you and all experienced travelers is Pan American-Grace Airways' excellent record during 23 years of service to the Americas. Nevertheless, *elegance* is pretty important, too . . . and Panagra knows how to provide plenty of it. *El Inter Americano* is the world's most luxurious DC-6 . . . and the fastest way to Buenos Aires. A red carpet is rolled out for every departure and arrival.



It's 500 miles shorter from New York to Buenos Aires via the West Coast of South America, over the routes of Pan American and Panagra.

Pan American-Grace Airways

1951 Trans-Atlantic Passengers—Ship vs. Air

	Steamer						Air	
	First Class	One Class	Cabin Class	Tourist Class	No. of Voyages	Total Passengers	No. of Flights	Total Passengers
Eastbound	68,609	22,942	55,690	140,401	599	287,642	5,378	151,627
Westbound	82,346	45,087	75,896	219,121	600	422,450	5,462	187,469
Both Ways	150,955	68,029	131,586	359,522	1,199	710,092	10,840	339,096

NOTE: Above figures are for the period Dec. 31, 1950, to Dec. 29, 1951. Air flights and passengers include charters.

	Passengers	*Trips*
Air France ...	—6.1%	—7.3%
BOAC	+41.2	+22.4
KLM	+17.9	+11.5
PAA	+33.4	+21.1
SABENA	—4.5	+1.4
SAS	+2.5	+ .7
Swissair	+44.4	+12.3
TCA	+23.9	+14.6
TWA	+9.6	+4.6

East and West Totals

Eastbound revenue passengers from the U. S. and Canada totaled 147,903, with the U. S. carriers handling 76,887, or 51.9%, on 2,498 flights (46.9% of total). Westbound, the U. S. share was 87,721 (48.5%) out of 180,861, with 2,513 flights (46.8%). In 1950, three U. S. lines accounted for 57.3% of passengers eastbound and 55.3% westbound.

Both ways, out of 328,764 passengers, PAA and TWA carried 164,608 (50.07%) on 5,011 trips (46,83%).

Cargo carried both ways across the Atlantic in 1951 totaled 8,264.5 tons, up 21.4% over 1950. Largest cargo carrier was PAA, with 1,807.4 tons. The foreign lines, however, increased their combined load. Eastbound, they hauled 2,902.3 out of 4,244.8 tons, or 68.4%. Westbound, they handled 2,349.8 out of 4,019.7 or 58.5%. Both ways, they carried 63.6%, 5,252.1 tons out of 8,264.5.

In 1950, the foreign lines' eastbound percentage of cargo total was 56.7%; westbound, 56.6%; both ways, 56.6%. In 1949, U. S. lines led, with 53.7% both ways.

During the year, 348 all-cargo trips were operated (both ways), almost all of them by KLM (178) and SAS (150). U. S. lines operated only nine. In 1950, there were 378 cargo trips, with 602 in 1949.

Air mail in 1951 showed an 11.3% jump, from 3,823.4 tons both ways in 1950 to 4,257.8. The U. S. lines maintained their lead, principally because they handle most of the eastbound mail —2,043.7 out of 2,540.1 tons, or 80.4%.

Slight Drop

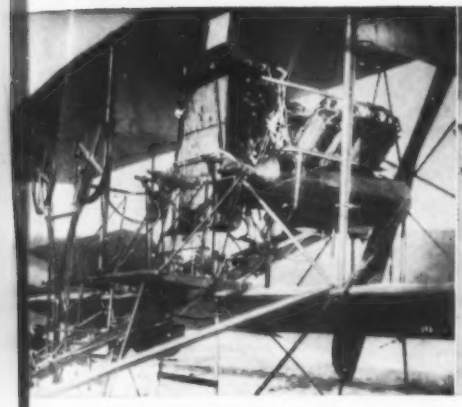
In the reverse direction, foreign lines dominated, with 1,034.6 out of 1,717.7 tons, or 60.3%. Division both ways was 64% U. S. and 36% foreign. The 1950 division was 65.5% U. S., 34.5% foreign.

Air Traffic Between U.S.—Canada and Europe, 1951

	Air France	BOAC	El Al*	KLM	LAI†	PAA	SABENA	SAS	Swissair	TCA	TWA	Total
Eastbound												
Revenue Passengers	10,363	22,869	693	13,440	1,335	42,019	3,632	10,085	2,560	6,039	34,868	147,903
Passenger Flights	437	701	49	513	77	1,245	174	392	118	371	1,253	5,330
All-cargo Flights	3	4	0	104	0	1	3	82	0	0	3	200
Av. Pass. per Flight	23.7	32.6	14.1	26.2	17.3	33.7	20.9	25.7	21.7	16.3	27.8	27.8
Cargo (tons)	322.3	578.6	4.7	940.3	44.2	858.8	163.6	584.1	99.3	165.2	483.7	4,244.8
Mail (tons)	52.2	88.1	.9	63.5	25.2	1,153.8	26.4	62.9	18.2	159.0	889.9	2,540.1
Westbound												
Revenue Passengers	12,073	27,580	533	17,476	1,683	49,726	4,100	12,591	2,866	14,238	37,995	180,861
Passenger Flights	440	699	49	522	77	1,242	178	401	118	372	1,271	5,369
All-cargo Flights	0	1	0	74	0	2	0	68	0	0	3	148
Av. Pass. per Flight	27.4	39.4	10.9	33.5	21.9	40.0	23.0	31.4	24.3	38.3	29.9	33.7
Cargo (tons)	267.8	437.4	.9	755.6	42.7	948.6	127.2	317.1	97.2	304.0	721.3	4,019.7
Mail (tons)	238.9	444.2	2.3	99.7	33.9	312.5	9.5	146.4	45.5	14.2	370.6	1,717.7
Both Ways												
Revenue Passengers	22,436	50,449	1,226	30,916	3,018	91,745	7,732	22,676	5,426	20,277	72,863	328,764
Passenger Flights	877	1,400	98	1,035	154	2,487	352	793	236	743	2,524	10,699
All-cargo Flights	3	5	0	178	0	3	3	150	0	0	6	348
Av. Pass. per Flight	25.6	36.0	12.5	29.9	19.6	36.9	22.0	28.6	23.0	27.3	28.9	30.7
Cargo (tons)	590.1	1,016.0	5.6	1,695.9	86.9	1,807.4	290.8	901.2	196.5	469.2	1,205.0	8,264.5
Mail (tons)	291.1	532.3	3.2	163.2	59.1	1,466.3	35.9	209.3	63.7	173.2	1,260.5	4,257.8

NOTE: Charter flights are not included in totals.
** El Al started service May 1, 1951.*
† LAI figures are for March-December.

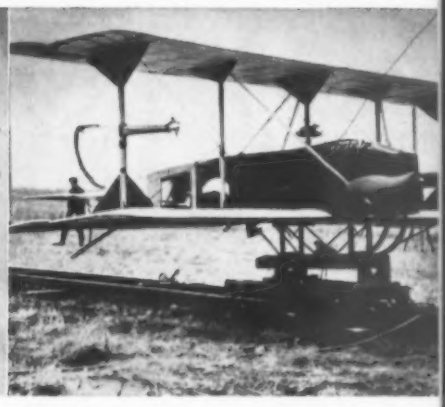
40 YEARS OF AUTOMATIC FLIGHT...BY SPERRY



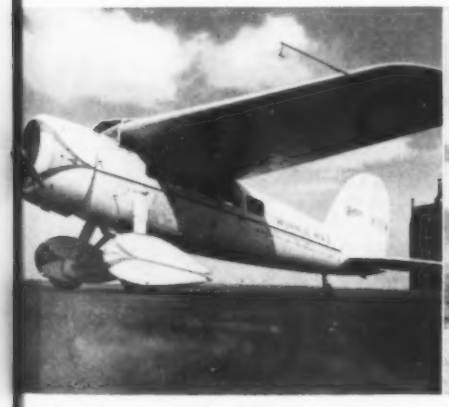
1912 The first Sperry automatic pilot was flight tested in a Curtiss hydroaeroplane in 1912 at Hammondsport, New York. This was the world's first gyroscopic automatic pilot to fly an aeroplane.



1914 Lawrence Sperry, in a public demonstration of automatic flight in Paris, 1914, won the International Safety Competition with his "stable" aeroplane.



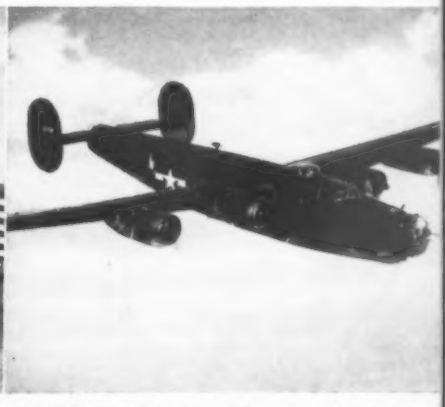
1916 Ancestor of the guided missile was the aerial torpedo developed during 1916-18 by Sperry working with the U.S. Navy. These automatically controlled "flying bombs" were tested over Great South Bay, Long Island.



1933 Automatic flight again won public acclaim in 1933 when Wiley Post made the first solo flight around the world with the Sperry automatic pilot as his "co-pilot" in the WINNIE MAE.



1937 First completely automatic landings were made by the U.S. Army Air Corps in 1937 by coupling radio aids to the Sperry automatic pilot.



1943 The first electronic automatic pilots flew thousands of B-24s in World War II and advanced the art of precision bombing by providing an improved stable platform.



1947 The first "pushbutton" aircraft, U.S. Air Force's All-Weather Flying Division's C-54, equipped with Sperry automatic pilot and automatic approach control, crossed the Atlantic both ways in 1947 without human hands touching the controls—including take-offs and landings.



1952 The modern Gyropilot* flight control is the outgrowth of Sperry's 40 years of research, development and manufacture of automatic controls for aircraft. This versatile, all-weather pilot represents a high-performance technique for automatic control which is readily adaptable to all types of aircraft—airliners, executive craft, jets, helicopters, lighter-than-air ships and guided missiles. This technique pioneered by Sperry has led to a new fundamental concept of flight for the aircraft of tomorrow. Sperry Gyroscope Company Division of The Sperry Corporation, Great Neck, New York.

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World Airline Transports — 80% U.S.-Made

THERE are 3,880 aircraft in use in scheduled common carrier service, up 1.5% over the 3,775 aircraft in this type service in 1950. Eighty percent of these aircraft are of U. S. manufacture with the remainder divided as follows: 13% United Kingdom; 7% between Australia, Canada, France, Germany, Italy, Peru, Sweden and Russia.

Douglas Aircraft Company accounted for 2,161, 56%, of all aircraft covered by the study. Douglas, plus four other companies, built 79% of the entire fleet.

Twin-engine planes are predominant in the lists with 2,561 falling in this category. Four-engine aircraft account for another 990 and single-engine aircraft 233.

A comparison of aircraft types in three successive years shows:

Year	4-engine	2-engine	land/ or 3-engine
1951	990	2,561	279
1950	942	2,498	335
1949	922	2,556	354

Figures on U. S. airline aircraft are not listed in this compilation but appear elsewhere in this issue (Pages 50, 51). While some information is included on the civil fleets of Iron Curtain countries, accurate figures on the number of aircraft of each type operated by these countries plus Peru and Argentina were not available at the time the Civil Aeronautics Board completed this survey. These omissions are in the listings of Russia's Civil Air Fleet Administration, Hungary's MASZOVLET, Argentina's LADE, and Peru's TAM lines.

Selected Data on Foreign Airline Equipment

Manufacturer	Model	Country of Mfg.	No. in Service	No. of Engines	No. of Pass.
Aeronca	.....	U.S.	1	1	1
Airspeed	.....	U.K.	1	2	6
	Consul	U.K.	11	2	6
	Oxford	U.K.	7	2	8
Auster	V	U.K.	2	1	1
A.V. Roe (AVRO)	Anson	U.K.	69	2	6
	Lancastrian	U.K.	13	4	13
	Tudor	U.K.	9	4	32
	York	U.K.	33	4	21
	XIX	U.K.	2	2	9
Beechcraft	Bonanza	U.S.	5	1	3
	C-43	U.S.	3	1	4
	C-45	U.S.	19	2	6
Bell	.....	U.S.	2	1	1
Bellanca	.....	U.S.	4	1	5
	Skyrocket	Canada	1	1	5
	66	U.S.	1	1	15
Bloch	Languedoc	France	36	4	32
Boeing	Stratocruiser	U.S.	10	4	60
	Stratoliner	U.S.	2	4	38
	40B	U.S.	1	1	4
	247D	U.S.	10	2	13
	299	U.S.	3	4	..
Bristol	Wayfarer	U.K.	12	2	34
Budd	Conestoga	U.S.	1	2	27
Buhl	Airsedan	U.S.	1	1	4
Canadair	DC-4M2	Canada	45	4	40
Canso	.....	Canada	3	2	20
Caudron	Goeland 449	France	8	2	6
Cessna	C-78	U.S.	6	2	4
	140	U.S.	1	1	1
	170	U.S.	2	1	3
	195	U.S.	9	1	4
Consolidated	Catalina	U.S.	38	2	18
	Commodore	U.S.	1	2	22
	Liberator	U.S.	7	4	30
	L-5	U.S.	13	1	1
Consolidated Vultee	Convair	U.S.	43	2	40
Culver	PQ-14B	U.S.	3	1	1
Curtiss	.....	U.S.	2	1	6
	Commando	U.S.	39	2	40
	Condor	U.S.	1	2	18
	Robin	U.S.	2	1	2
DeHavilland	Beaver	Canada	5	1	5
	Dominie	U.K.	31	2	5
	Dove	U.K.	65	2	11
	Dragon	U.K.	16	2	..
	Dragonfly	U.K.	3	2	4
	Express	U.K.	2	4	15
	Fox Moth	U.K.	5	1	3
	Gypsy Moth	U.K.	1	1	1
	Hornet Moth	U.K.	2	1	1
	Leopard Moth	U.K.	2	1	2
	Moth Minor	U.K.	1	1	1
	Rapide	U.K.	68	2	5
	Tiger Moth	U.K.	10	1	1
Desoutter	.....	U.K.	1	1	2
Douglas	C-47	U.S.	99	2	0
	C-54	U.S.	5	4	0
	DC-2	U.S.	3	2	14
	DC-2½	U.S.	5	2	14
	DC-3	U.S.	1060	2	21
	DC-4	U.S.	149	4	44
	DC-6	U.S.	41	4	52
Fairchild	.....	U.S.	1	1	5
	PT-19	U.S.	1	1	1
	PT-26A	U.S.	2	1	1
	UC-61	U.S.	3	1	3
	82	Canada	2	1	10
Faucett Stinson	F-19	Peru	6	1	3
Fiat	G-212	Italy	6	3	26
Focke-Wulf	FW-200	Germany	2	4	26
Fokker	Universal	U.S.	1	1	4
Ford	Trimotor	U.S.	3	3	13
Grumman	Goose	U.S.	9	2	6
Handley Page	Hermes	U.K.	7	4	40
Ilyushin	IL-12	U.S.S.R.	19	2	30
Junkers	F-13	Germany	2	1	4
	JU-52	Germany	3	3	12
	JU-52/3	Germany	34	3	17
	W-34	Germany	1	1	6
	LI-2	U.S.R.R.	21*	2	27
Lockheed	Constellation	U.S.	76	4	48
	Electra	U.S.	21	2	10
	Hudson	U.S.	11	2	14
	Lodestar	U.S.	57	2	18
	Vega	U.S.	1	2	6
Martin	202	U.S.	6	2	36
Messerschmitt	Taifun	Germany	1	1	..
Miles	Aerovan	U.K.	1	2	9
	Gemini	U.K.	1	2	3
	Magister	U.K.	2	1	1
Noorduyn	Norseman	Canada	26	1	8
North American	AT-6	U.S.	2	1	1
Percival	Proctor	U.K.	2	1	4
Pilgrim	.....	U.S.	4	1	8
Piper	Supercruiser	U.S.	2	1	2
	J-3	U.S.	2	1	1
.....	L-4	U.S.	1	1	1
	PO-2	U.S.S.R.	..	1	3
Rearwin	9000	U.S.	2	1	1
Republic	Seabee	U.S.	3	1	3
Ryan	.....	U.S.	3	1	5
SAAB	Scandia	Sweden	11	2	32
Savoia-Marchetti	SM-95	Italy	10	4	41
Short	Plymouth	U.K.	11	4	22
	Sandringham	U.K.	10	4	37
	Solent	U.K.	14	4	24
	Sunderland	U.K.	5	4	22
Siebel	204	Germany	10	2	8
SNCASO	Corse 2 (S.O.-95)	France	2	2	10
	S.O.-30	France	1	2	37
Spartan	.....	U.S.	4	1	4
Stinson	.....	U.S.	8	1	3
	Voyager	U.S.	6	1	3
	108	U.S.	4	1	3
Taylorcraft	.....	U.S.	1	1	1
Travel Air	.....	U.S.	1	1	5
	.....	U.S.	8	1	5
Verville	.....	U.S.	1	1	3
Vickers	Stranraer	Canada	1	2	0
	Viking	U.K.	90	2	24
Vultee	.....	U.S.	1	1	1
	BT-13	U.S.	1	1	1
	Special V-1	U.S.	1	1	6
Wackett	Trainer	Australia	1	1	1
Waco	.....	U.S.	4	1	4
Westland Sikorsky	S-51	U.K.	3	1	3

* *An additional undetermined number in use.*

Source: American Aviation Survey

Can You Identify this Registry?



AIRCRAFT NATIONALITY MARKS

*Argentina LV	*France ..... F	*Nicaragua ..... AN
*Australia ..... VH	*Greece ..... SX	*Norway ..... LN
Austria ..... OE	Guatemala ..... TG	*Pakistan ..... AP
*Belgium ..... OO	Haiti ..... HH	*Paraguay ..... ZP
*Brazil ..... PP, PT	*Iceland ..... TF	*Peru ..... OB
*Burma ..... XZ, XY	*India ..... VT	Poland ..... SP
*Canada ..... CF	*Indonesia ..... PK	*Portugal ..... CS, CR
*Ceylon ..... CY	Iran ..... EP	*Philippine Republic ..... PI
*Chile CC	Iraq ..... YI	*Saudi Arabia ..... HZ
*China ..... B	Ireland ..... EI, EJ	*Sweden ..... SE
*Colombia ..... HK	*Italy I	*Switzerland ..... HB
Czechoslovakia ..... OK	Lebanon ..... LR	Syria ..... YK
*Denmark ..... OY	Liberia ..... EL	*Thailand ..... HS
*Dominican Republic ..... HI	Luxembourg LX	Turkey ..... TC
*Ecuador ..... HC	*Mexico ..... XA, XB, XC	*Union of South Africa ..... ZS, ZT, ZU
Egypt ..... SU	*Netherlands ..... PH	*United Kingdom ..... G Colonies and Proctectorates ... VP, VQ, VR
El Salvador ..... YS	* Netherlands Antilles ..... PJ	*United States ..... N
*Ethiopia ..... ET	* Surinam ..... PZ	*Uruguay CX
*Finland ..... OH	*New Zealand ..... ZK, ZL, ZM	*Venezuela ..... YV

*** VICKERS AIRCRAFT HYDRAULICS IN USE**

This table includes all nationality marks that have been formally notified to ICAO up to September 30, 1951. Those countries marked with an asterisk have registered commercial aircraft which use Vickers hydraulics. Write to Vickers Incorporated for a 2½" x 4" plastic wallet card which gives you a permanent record of world civil aircraft registration codes.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921



BRISK COMPETITION is coming from such designs as the Airspeed Ambassador.

Britain Eyes Transport Leadership

But the United Kingdom's head start in jet development is counterbalanced by several factors.

By RICHARD G. WORCESTER

IF BRITAIN can keep its head above water the U. S. can expect some formidable competition in the next five years, for it seems likely at this time that the civil transport strength of the United Kingdom will offset its apparent weaknesses.

The U.K.'s strength lies in the fact that after spending some $400,000,000 on research and development of civil transport projects, the country has started bidding for world markets in long-, medium-, and short-haul categories. The rest of the decade will be spent in developing, extending, "stretching," and generally refining basic designs.

Essential Weakness

The need to rearm, combined with the withering away of many of the country's strongest overseas markets, accounts for the essential weakness of the British position and is reflected in the level of activity in all British industry. The net effect of these conditions is a lengthening in current delivery promises. Bristol, for instance, has some 30 freighters on order, but as only two of the cargo planes are built each month, the delivery delay is over two years. The Comet, Ambassador, Britannia, particularly the Viscount, and even the lighter Prince and Dove are all similarly affected. But, after all, many U. S. manufacturers are also requesting customers to anticipate their requirements by two years.

On the whole, British prices for equipment are generally comparable with those for similar U. S. products. Britain has the advantage, although somewhat offset by its small production lines, since it pays wage rates that are about half those demanded by U. S. workers. When the day comes that de Havilland can plan for an 150-Comet line, instead of the present 50, British prices will come tumbling down. The McCarran bill might then be a saving grace for U. S. international operators, offering them the differential subsidy to compensate for the lower prices their competitors would be paying for intercontinental commercial air equipment.

The main difficulty in the U.K. is that de Havilland is the only company with any real experience in large-scale civil sales technique, being the only company with anything resembling a world-wide sales and service organization. S.B.A.C. offices overseas have all been withdrawn just at the time when there is a crucial need to keep the merits of British products before local authorities in different parts of the world. The manufacturers themselves, however, are opening up individual shops in several countries; i. e., Bristol in Australia and Canada.

The difficult question of design warranty, a test of sales and service, has occasioned much soul-searching. Industry has come around now to the view that it is more likely to keep its customers if it can offer a design warranty longer than Lockheed's 1,000 hours or six months. With the prohibitive loss in revenue from even short withdrawals from service for design rectifications still fresh in the minds of many operators, the worth of new airliners is expressed by conditions of after-purchase service.

Complete Information

Talking "big" is not the least of the qualities needed to sell in these hard, money-conscious, postwar years. The British have been watching the way American developments, such as the latest Connie or DC-6, are on everybody's lips. Although performance, delivery dates, and prices are characteristics that finally sell aircraft, the way must be smoothed by a policy of complete information, and the convincing discussion of future British plans.

If world operators are going to invest millions of dollars worth of equipment in U.K. products, they have the right to know something of the basis on which its whole construction enterprise has evolved. The frank way in which some leading British companies are now discussing their new developments is a sign of the times.

U. K.'s Big Seven

CURRENT PRICE INDICATIONS

Engines		Airframes (less engines)	
Ghost jet	$42,000	Comet 1	$1,100,000
Avon jet	60,000 (appr.)	Comet 2	1,170,000
Proteus prop-jet	67,000	Britannia	1,090,000
Dart prop-jet	24,000	Ambassador	532,000
Centaurus	34,000	Viscount	500,000
Hercules	25,000	Bristol 170	140,000
Leonides	12,500	Bristol 173	173,000
		Prince	59,000

"STRETCH" POSSIBILITIES

Rough guide to future developments

1952	1954	1956
Comet 1 (105,000 lb.)	Comet 2 (115,000 lb.)	Super-Comet (600 mph)
Britannia	Britannia (long body)	Britannia (Nomads?)
Bristol 173 (helicopter)	173 (Leonides Major)	"Winged 173" (4 Darts)
Bristol Freighter 170	170 (Long nose)	170 (Proteus?)
Ambassador	Ambassador (55,000 lb.)	Ambassador (4 Darts)
Viscount		Super-Viscount
Prince	Prince (Leonides Major?)	Prince, lengthened



PROGRESS REPORT FROM AMERICAN AIRLINES

Commercial air transportation has become a basic element of our transportation system and an increasingly important part of National Air Power.

Attainment of this position is, we believe, largely due to the fact that the airlines have kept abreast of technological progress. In American Airlines, for example, the policy has long been to adopt and use each new proven technique and equipment as soon as it becomes available. This planning is necessary to maintain the company's position as the largest carrier of air passengers in the world.

American has on order 25 of the newest transport aircraft design, the DC-7, powered by turbo-compound engines, which will cruise over 360 miles per hour. In 1951, the company received 17 DC-6B's, the most modern of this famous passenger series actually in service, and has ordered 11 additional planes of the DC-6A, cargo version, and DC-6B types.

American has for some time been the largest operator of a completely post-war fleet. Pending orders will bring this total to 195 aircraft.

This fleet is designed for the peaceful purpose of offering both the passenger and shipper the latest and finest in air transportation. However, in the event of a national emergency, it would be available at a moment's notice to transport the personnel and materiel of war.

AMERICA'S LEADING AIRLINE **AMERICAN AIRLINES** INC.

France Studies Future Transport Projects

Leading manufacturers submit 20 propositions built around turboprops, turbojets, and ducted fans.

THE French Civil Aeronautics Administration (Secrétariat Général à l'Aviation Civile et Commerciale) sometime ago set up a special panel called the Civil Material Committee (Comité du Matérial Civil). The mission of this committee was to study the likely development of civil air transport during the 15 to 20 coming years and to promote the construction of a medium transport carrying 60 passengers with a maximum range of about 1,240 miles. Maximum speed was to be 373 mph at 24,600 feet.

Twenty Propositions

French manufacturers who made application handed over about 20 propositions to the French administration. The airplanes could be used economically on flights between 500 and 2,000 miles. At this time, projects of the French manufacturers seem to have no counterpart in foreign countries.

The following projects were submitted:

BREGUET

Bréguet Type 978: Under this designation Bréguet submitted several projects which can be grouped under three headings:
a) turbojet transport;
b) transport with ducted-fan;
c) turboprop transports, and airplanes with a combination of turboprop and turbojet.

All these airplanes are low-winged and have some fuselage. Wing and tail areas differ with the type of power chosen.

978 A: Powered by three French-built ATAR 101 D's. Two jets are mounted in the wings close to the fuselage; the third is mounted behind the passenger cabin. The air intake would be located above the rear end of the fuselage under the crest of the fin. Swept-back wing.

978 F: Powered by four ducted-fan engines hung separately under each wing. Classic wing.

978 T: Powered by four French-built (SNECMA) turboprops TB 1000 mounted in the forward part of the wings. Wing similar to that of type F.

978 P: Powered by two turboprop Bristol "Proteus'" mounted in the wing and one turbojet ATAR or AVON in the rear part of the fuselage. Wing similar to that of Type F.

978 AP: Powered by 12 jets located like the two turboprops of type P and one Proteus turboprop in front of the fuselage.

978 TA: Powered by four turboprop TB 1000's with one jet in the rear part of the fuselage.

978 S: Derived from type 978 A, this version is powered by two lateral jets and two turboprop TB 1000's. The rear jet engine is buried.

SNCASE

Societe Nationale de Constructions Aeronautiques du Sud Est

X 210 R: Swept-back, low-winged airplane powered by three ARTAR turbojets mounted in the rear part of the fuselage, two laterally, the third beneath.

X 210 ducted-fan engines: This version is high-winged, the four ducted-fan engines are hung in two nacelles under the wing (as in the B-47).

X 210—turboprops: Classic low-winged transport.

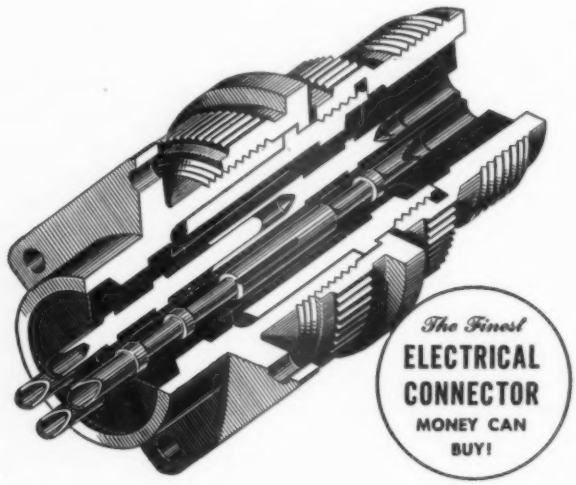
SNCAN

Societe Nationale de Constructions Aeronautiques du Nord

Nord—3000—ATAR: Three jet en-

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gines and low, swept-back wings. Two jets mounted in the wings; one jet in the rear of the fuselage beneath or in it.

Nord 3000—Ducted-fan engines: Low, classic wing. The four ducted-fan engines are distributed in two pairs mounted on each side of the fuselage.

SNCASO

Societe Nationale de Constructions Aeronautiques du Sud Ouest

SO 60 A: Low, swept-back wing. Three turbojets. Two hung beneath wing, third mounted in the rear of the fuselage half under it or entirely in it. Third version with jet under central part of wing.

SO 60 B: Classic low wing. Four-ducted-fan engines hung by pairs from the struts.

SO 60 C: Low, swept-back wing. Two ATAR 101 E turbojets mounted on the struts of the wing and two auxiliary jets (Turbomeca Marbore II) built in the rear of the wing above the main jets.

MARCEL DASSAULT

Dassault 900: Low, swept-back wing. Two ATAR 101 D turbojets mounted in the wing, in the rear part of fuselage. Air intakes on fence of wings.

HUREL DUBOIS

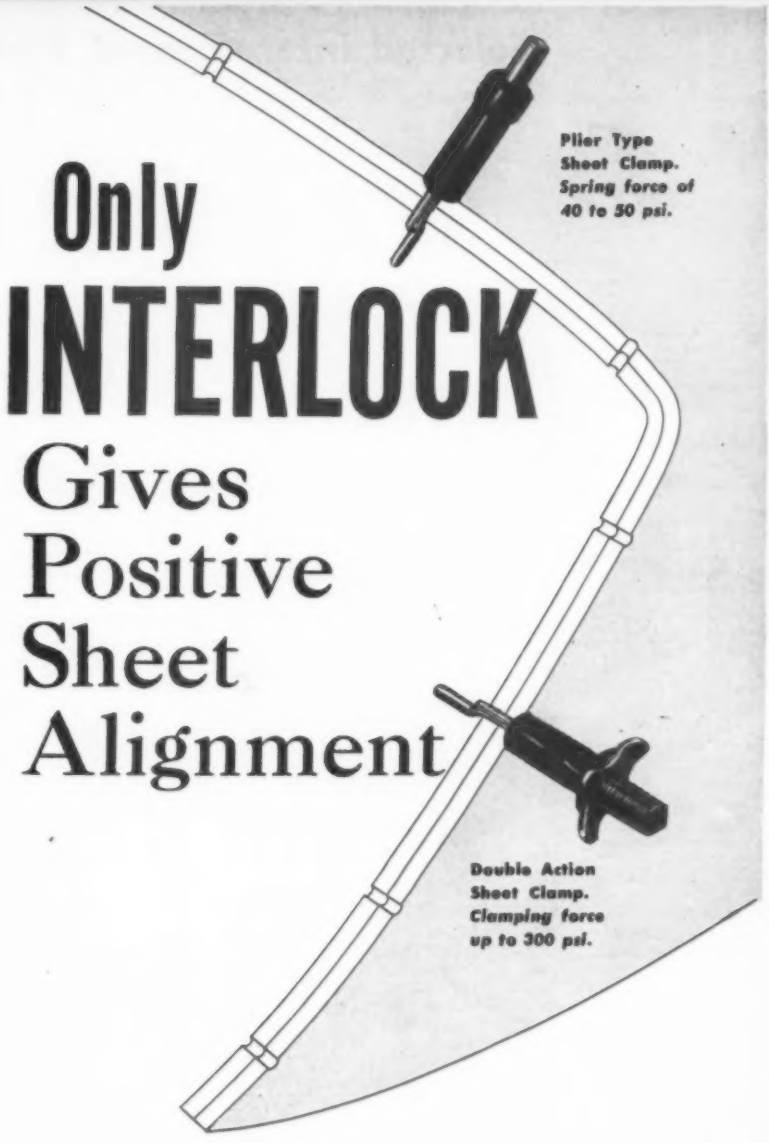
High, swept-back, extremely broad wing. The two turbojets are mounted on the winglet which supports the masts bearing the main wing.

H D 41: Two ducted-fan engines on the winglet, two hung under the main wing.

A comparative study of cruising-speeds, duration of flight, altitudes, take-off lengths, influence of temperature, loads, costs, and construction difficulties seems to have led the committee to give the manufacturers a choice between three engines: turboprops, turbojets, and ducted-fans.

It is likely that the combined version (two jets and two turboprops) will finally be selected. Its disadvantages (two types of engines requiring more spares, addition of difficulties peculiar to the turboprops to those proper to the turbojets, soundproofing troubles due to location of jets in the wing, inconveniences due to the propellers, and possibility of vibrations and interferences due to the combination of jets and propellers), would be more than compensated for by the operational flexibility, take-offs on short runways, low fuel consumption, importance of payload, and the very great range of the combined airplane.

After the selection of the modes of propulsion has been made, the program will be redefined and two manufacturers will be selected to present more detailed projects. French authorities estimate the prices of the different projects submitted to them between 60 and 360 million francs. Adoption of a combined proposition (turbojets and turboprops) would lead to reconsidering the decision to cancel fabrication of the turboprop type TB 1000B.



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Selected International Traffic Figures

Airline		Rev. Pass. Carried	Rev. Pass. Seat-Miles Available	Rev. Pass. Miles Flown	Rev. Pass. Load Factor	Ton-Miles Available, Pass. Cargo & Mail	Cargo Carried	Cargo Ton-Miles Flown	Mail Carried	Mail Ton-Miles Flown	Overall Rev. Load Factor	Rev. Aircraft Miles Flown
Aer Lingus	1950*	199,023	63,388,990	44,427,899	69%	7,123,055	2,276	476,223	159	28,614	65%	2,698,973
(Ireland)	1951*	221,542	72,299,490	50,271,034	69%	8,132,432	2,837	587,636	245	43,860	65%	3,065,735
Aero-Africaine	1950	n.a.	n.a.	5,871,836	n.a.	n.a.	150§	48,081§	n.a.	n.a.	n.a.	n.a.
(Algeria)	1951	13,218	n.a.	5,394,918	n.a.	n.a.	988	23,381	n.a.	n.a.	n.a.	505,626
Aero O/Y	1950	75,606	26,250,846	16,640,388	63.4%	2,785,274	3,251	89,965	2,084	53,510	66.1%	1,288,457
(Finland)	1951	91,387	38,388,310	22,151,116	66.3%	3,764,616	3,489	96,779	1,992	51,190	64.2%	1,583,229
Air France	1950	160,600,234	1,088,361,148	693,151,076	63%	764,646	29,879	22,807,571	7,649	9,769,847	64%	30,040,797
	1951	167,668,346	1,131,026,461	783,000,791	69%	970,979	34,869	25,740,650	8,583	11,022,965	70%	30,043,288
Air Rimouski	1950	47,450	3,035,995	2,263,382	74%	46,223	36,562	1,314,583	152	12,875	80%	441,760
(Canada)	1951	84,748	7,414,601	3,630,091	50%	823,470	46,317	2,060,300	278	17,010	60%	430,225
Airways (India) Ltd.	1950	102,646	53,392,962	30,700,961	57.5%	10,417,418	12,040	3,467,707	872	294,309	64.8%	3,526,542
	1951	111,472	65,136,819	37,672,138	57.8%	12,714,979	15,341	4,847,633	269	108,818	67.8%	4,208,254
Australian National	1950	605,939	449,885,436	257,181,540	57.16%	63,491,839	34,164	14,578,640	157	62,493	60.26%	16,447,155
Airways Pty. Ltd.	1951	668,624	481,554,452	275,887,336	57.29%	69,485,302	38,989	16,899,662	195	81,729	61.25%	17,380,559
Avianca (Aerovias Nacionales												
de Colombia)	1950	573,712	235,544,563	139,937,194	59%	38,874,654	43,625	12,567,077	387	123,632	68%	8,887,700
	1951	606,460	253,604,371	154,720,549	61%	49,969,747	63,440	19,172,076	415	124,147	69%	n.a.
Bharat Airways Ltd.	1950	84,369	n.a.	21,544,019	n.a.	7,636,338	12,983	2,726,338	279	119,756	59.64%	2,453,668
(India)	1951	70,631	n.a.	22,895,556	n.a.	7,358,555	10,819	2,450,859	371	151,952	59.32%	2,404,720
British European	1950	912,604	429,823,148	259,046,195	60.3%	52,528,207	10,515†	4,194,505†	5,097	2,159,243	58.6%	20,562,220
Airways	1951	1,121,439	493,968,220	329,452,420	66.7%	60,185,609	13,121	5,236,022	6,149	2,479,024	64.4%	23,000,793
Canadian Pacific Air	1950	149,807	n.a.	79,049,029	n.a.	n.a.	3,050	1,208,127	1,030	451,621	n.a.	5,972,167
Lines	1951	184,415	n.a.	127,358,760	n.a.	n.a.	2,850	1,234,099	967	454,202	n.a.	7,934,181
Central African Air-	1950	49,553	37,366,713	24,524,607	66%	4,506,079	573	378,701	284	198,289	65%	1,862,971
ways Corp.	1951	70,777	54,544,666	35,659,196	65%	6,474,549	664	418,733	346	243,848	63%	2,784,062
Cubana (Compania	1950	197,500	121,342,000	64,229,000	52.9%	15,275,841	1,312	390,714	n.a.	103,865	47.42%	3,801,948
Cubana de Aviacion)	1951	218,743	125,571,000	66,563,000	53.01%	15,486,588	1,111	328,735	n.a.	88,319	48.13%	3,887,842
Deccan Airways Ltd.	1950	32,592	27,831,972	15,321,423	50.6%	2,983,523	760	310,230	164	90,300	65.2%	1,325,339
(India)	1951	52,883	46,941,216	27,664,382	54.1%	5,052,093	1,155	533,638	1,117	707,530	79.9%	2,235,296
Garuda Indonesia	1950	209,048	137,631,275	108,057,234	78.4%	19,750,156	9,980	5,968,415	1,463	1,063,744	73.9%	6,909,190
Airways	1951	290,876	210,814,734	159,534,837	75.7%	28,108,395	14,531	8,941,819	2,215	1,697,932	77.2%	9,180,251
Hong Kong Airways	1950	n.a.	n.a.	n.a.	n.a.	n.a.	n.a	n.a.	n.a.	n.a.	n.a.	n.a.
Ltd.	1951	3,350	3,522,640	1,474,000	45%	496,971	251	100,206	13	5,236	57.11%	156,200
Iberia (Lineas Aereas	1950	280,115	151,992,422	109,627,121	72.1%	20,680,739	710	334,954	329	236,727	62.4%	4,965,507
Espanol) (Spain)	1951	364,005	n.a.	134,538,405	82.4%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	5,376,024
KLM Royal Dutch	1950	416,007	863,823,680	562,379,060	65.1%	129,912,305	11,312	17,016,770	1,546	4,935,425	65%	22,964,800
Airlines	1951	498,516	1,021,433,880	701,552,940	68.7%	154,387,355	14,156	22,404,980	1,669	4,422,360	67.9%	26,497,560
LAMSA (Lineas Aereas	1950	57,710	34,050,566	22,794,837	66.94%	4,127,455	769,630	353,139	77,256	46,219	67.64%	1,763,905
Mexicanas)	1951	75,909	41,059,104	30,489,588	74.25%	4,965,665	1,034,003	431,027	97,422	44,809	74.73%	2,170,703
Lineas Aereas Costar-	1950	n.a.	n.a.	1,611,757	n.a.	1,093,345	n.a.	908,264	n.a.	274,025	n.a.	n.a.
ricenses (Costa Rica)	1951	n.a.	n.a.	2,517,023	n.a.	1,982,911	n.a.	1,743,029	n.s.	260,111	n.a.	n.a.
Lineas Aereas de	1950	24,419	7,220,710	2,980,729	41.3%	1,796,648	6,140	1,087,647	53	6,726	60.9%	590,119
Nicaragua	1951	27,648	8,840,453	3,150,468	35.6%	3,815,403	15,045	1,836,834	41	5,722	20.7%	987,901
Misrair	1950	71,539	42,796,739	21,780,137	51%	4,079,649	1,141	383,601	33	15,562	60%	1,819,160
(Egypt)	1951	83,278	57,301,884	26,474,234	46%	5,433,118	1,583	586,406	124	32,049	53%	2,243,524
Middle East Airlines	1950	15,346	12,319,416	6,611,750	53.67%	1,460,708	263	157,512	9	3,403	59.43%	586,563
(Lebanon)	1951	22,412	15,573,205	8,396,601	53.92%	1,795,421	369	219,091	21	4,932	63.66%	743,049
New Zealand National	1950	230,962	74,014,752	60,527,077	81.78%	9,035,741	1,543	478,775	466	160,321	71.85%	4,693,251
Airways Corp.	1951	298,977	92,507,140	79,640,314	86.09%	12,148,472	5,598	1,502,576	885	283,736	77.59%	5,091,790
Orient Airways Ltd.	1950	76,537	86,226,061	51,256,906	59.44%	9,192,236	1,263	1,107,900	104	154,240	63.15%	2,996,911
(Pakistan)	1951‡	88,355	97,608,491	62,762,260	64.3%	9,994,296	987	975,707	124	198,401	67.9%	3,318,195
Philippine Air Lines	1950	242,852	238,456,400	116,492,776	48.85%	24,442,923	6,202	4,007,517	264	486,067	68.35%	7,347,969
	1951	290,685	241,558,339	130,258,016	53.92%	23,972,873	6,648	5,101,801	299	514,600	80.1%	7,393,585
Queen Charlotte Air-	1950	54,655	8,444,856	5,065,474	60%	761,412	292	26,441	10	1,436	n.a.	1,256,365
lines Ltd (Canada)	1951	73,411	15,496,763	9,184,772	59%	1,886,656	473	65,125	12	2,076	n.a.	1,814,205
Sabena Belgian Air	1950	195,466	315,946,526	159,609,255	50.5%	41,717,350	6,485†	7,510,862†	1,039	1,134,736	63.5%	10,068,545
Lines	1951	260,674	349,698,460	184,915,493	52.9%	49,509,030	8,725	12,892,847	1,597	1,578,014	70.9%	11,892,250
Scandinavian Air-	1950	425,348	552,146,122	299,901,005	54.3%	74,225,622	6,223	6,613,904	2,201	2,145,171	54.8%	14,541,995
lines System	1951	481,697	636,032,258	356,246,901	56.0%	87,058,274	8,430	9,579,072	2,577	2,660,491	57.7%	16,297,848
Siamese Airways Co.	1950	18,974	26,415,805	12,669,725	47.96%	2,201,799	248,293	170,350	n.a.	40,081	53.74%	1,414,580
	1951	23,089	26,712,700	14,997,075	56.14%	2,202,592	n.a.	150,280	n.a.	39,106	59.36%	1,320,504
Swiss Air Transport	1950	191,625	156,344,141	92,109,634	58.9%	18,789,014	2,584	1,568,450	1,087	489,470	63.4%	5,609,632
(Swissair)	1951	281,748	192,694,724	123,131,618	63.9%	23,502,321	3,894	2,194,440	1,410	762,920	68.4%	6,535,711
TAI (Companie de Transports												
Aeriens Intercontinentaux) (France)	1950	25,916	n.a.	78,107,245	n.a.	n.a.	1,366	2,742,815	n.a.	n.a.	n.a.	2,613,299
	1951	26,355	n.a.	86,008,127	n.a.	n.a.	2,080	4,422,344	n.a.	n.a.	n.a.	3,084,516
Trans-Canada Air	1950	823,509	664,849,872	454,078,109	68.3%	94,595,470	5,163	4,560,016	n.a.	4,039,090	58%	21,839,355
Lines	1951	973,337	745,279,578	545,160,296	73.1%	108,705,797	6,169	5,397,939	n.a.	4,468,093	60%	24,088,538
Turkish State	1950	84,959	34,843,606	20,735,430	59.51%	4,215,540	2,058	n.a.	83	n.a.	n.a.	1,658,924
Airlines	1951‡	121,500	40,600,700	30,856,780	76%	4,912,820	2,387	n.a.	106	n.a.	n.a.	1,933,160
Varig	1950	159,333	98,918,533	48,622,474	49.15%	9,412,960	6,978	3,104,040	93	32,021	78.3%	4,107,989
(Brazil)	1951	237,589	135,720,158	70,866,112	52.21%	13,282,724	10,156	4,480,182	102	34,962	80.61%	5,011,799

* *1950 figures are from Apr. 1, 1949 to Mar. 31, 1950; 1951 figures are from Apr. 1, 1950 to Mar. 31, 1951.*

† *Figures include excess baggage.*

‡ *Figures for 1951 are estimated.*

§ *Figures include mail.*

Note: All ton figures are short tons.

Source: American Aviation Survey.

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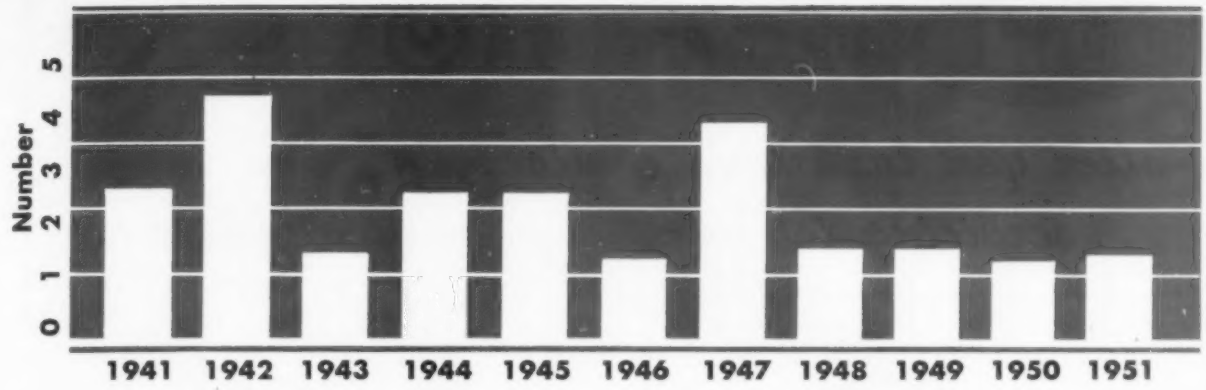
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Passenger Fatality Rate in Scheduled Domestic Operations



Safety Record Reflects Industry Efforts

Fatality rate of 1.3 per 100 million passenger-miles matches '48, '49 figures, just misses '51's.

AVIATION safety has been the subject of wide discussion and close examination during the past year. The over-all effect of this examination cannot help but be an improvement in air safety.

The scheduled domestic airlines, including trunks, local-service, and territorial lines, ended 1951 with a fatality rate of 1.3 deaths per 100 million passenger-miles. This compares with 1.1 fatalities per 100 million passenger-miles for this group in 1950. The 1951 record is identical to that of 1948 and 1949, which, with the exception of 1946 when the rate was 1.2, were the best years in airline history.

There were two fatal accidents in January, two in March, two in April and two in June. By this date the government and the airlines were very much concerned over the trend. Industry and government meetings were held, with high-level representation of all groups. Various tangible steps were taken to change the trend. By year's end, with two additional fatal accidents in revenue passenger-carrying operations, the fatality rate had been held in line.

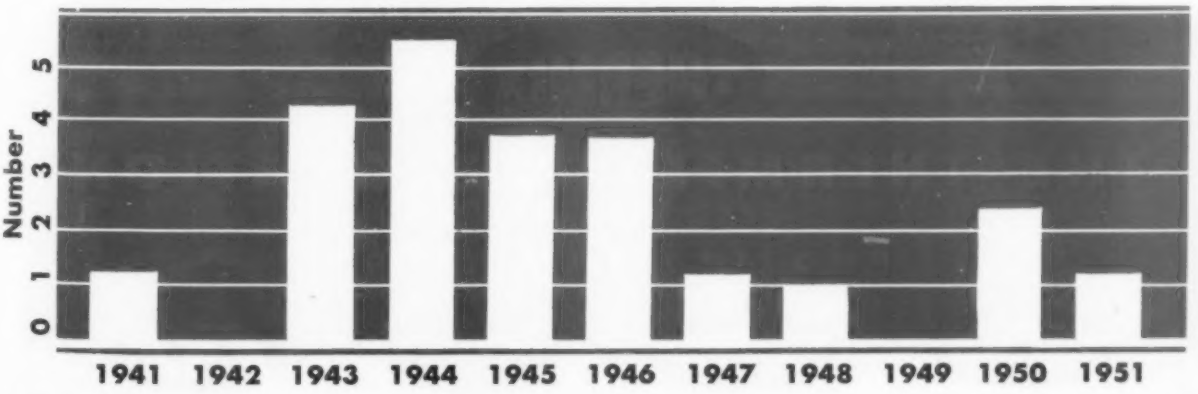
Passenger fatality rates are primarily of interest to the passenger. As sales points on aviation safety, from the traveling public's view, this is fine. From the airline standpoint, safety is more accurately measured by considering the number of accidents per plane-mile. In 1950 the airlines flew 87,344,951 revenue plane-miles per fatal accident. In 1951 this deteriorated to 52,907,241 plane-miles per fatal accident involving passengers. This is the highest rate of accidents since 1946.

In the international field the fatality rate per 100 million passenger-miles was 1.2 in 1951. This was a substantial improvement over the rate of 2.1 experienced in 1950, but was still above the rates of 1.1 in 1947 and 1.0 in 1948. Actually there was only one fatal accident by U. S. airline operators in the international field in 1951. This one accident in mid-year took the lives of 31 passengers and nine crew members.

This meant that the accident rate, considering fatal accidents in terms of plane-miles, was 10 per 99,001,300. This contrasts with 1.0 per 45,143,620 plane-miles in 1950 and 1.0 per 93,919,831 in 1948. Prior to 1948 the international picture was relatively poor. This was reflected in rates of one fatal accident per 27,708,696 plane-miles in 1947 and one per 28,548,831 in 1946.

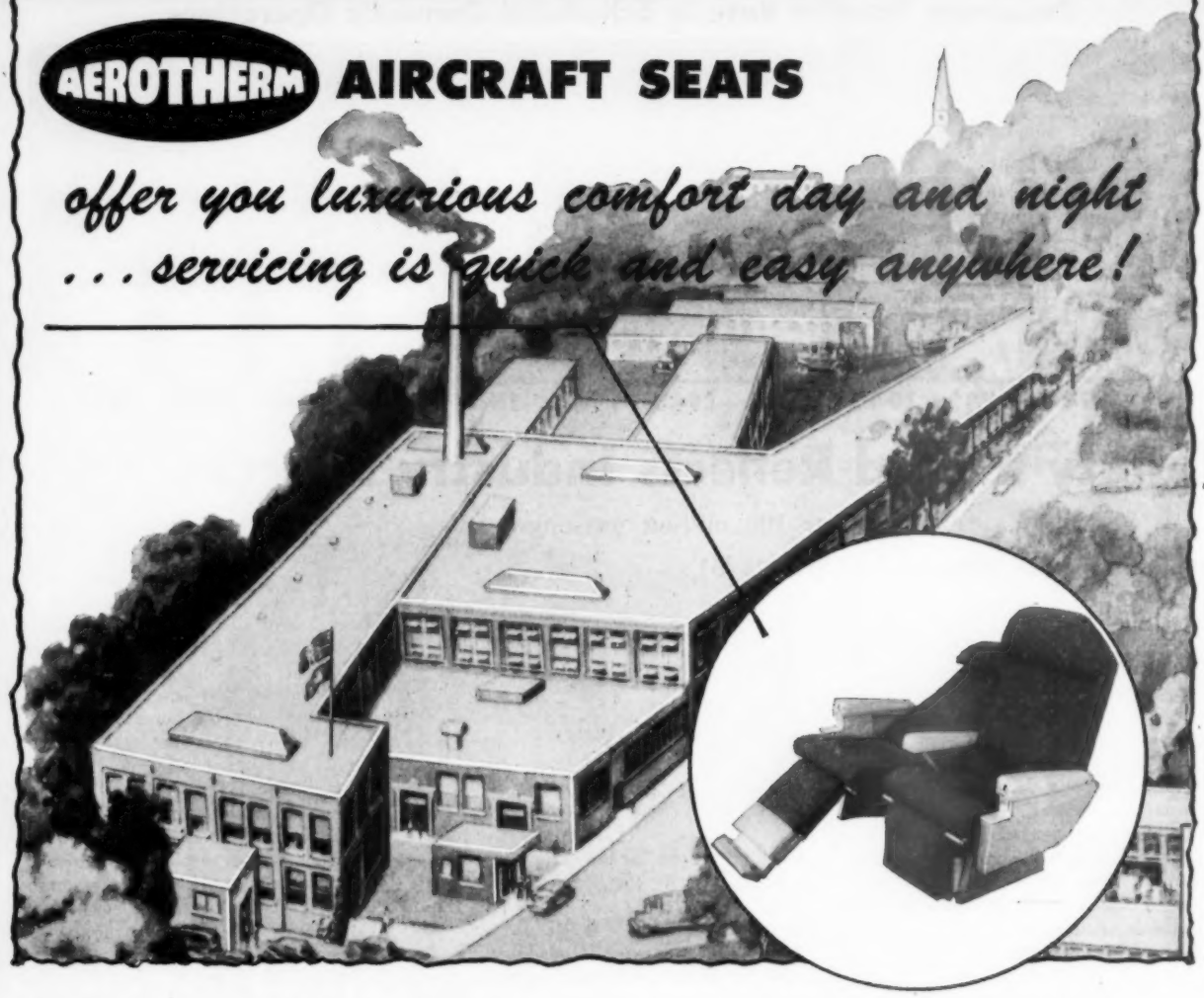
The large irregular air carriers had three fatal accidents in 1951 in the domestic field, which resulted in the deaths of 74 passengers and nine crew members. This record, spread across the 1,016,292,000 revenue passenger-miles operated by non-scheduled airlines in 1951, provides a fatality rate of 7.4 per 100 million passenger miles. This contrasts with a rate of 3.7 fatalities per 100 million passenger-miles in 1950. The 1950 record was a major improvement for the non-skeds and the 1951 rate of 7.4, while approximately double the 1950 rate, was still good compared with the 1949 record of 18.2 fatalities per 100 million passenger-miles and 20.4 in 1948.

Passenger Fatality Rate in Scheduled International Operations



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1951 Direct Operating Costs—U. S. Scheduled Airline Transports

Editor's Note: Direct operating costs shown here were compiled by survey of the airlines by AMERICAN AVIATION. The figures making interesting general comparisons but *are not suitable* for comparing the operating costs of two airlines using the same equipment. Such a comparison requires detailed information on the nature of depreciation, specific routes flown, general type of operation, major equipment modifications, etc.

	Douglas Aircraft Co.						Lockheed Aircraft				Boeing		Convair		Martin		Curtiss
	DC-3		DC-4		DC-6		DC-6B	649-749		1049	377		240		202		C-46
	1950	1951	1950	1951	1950	1951	1951	1950	1951	1951	1950	1951	1950	1951	1950	1951	1950	1951
All American	50.66	.52324	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
American	....	....	91.1	92.2	78.1	Co:76.4 Reg88.8	80.6	....	.....	.....	.....	.....	68.6	79.7	.....	....	....	....
Bonanza	38.72	48.77	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Capital	38.29	42.5 Cargo:41.2 Super:65.8	74.72	68.7	....	....	....	101.74	136.3	.....	.....	.....	....	....	.....	....	....	....
Central	....	50.7	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Chicago & Sou.	34.15	28.47	72.91	49.57	....	....	....	124.34	.....	.....	.....	.....	....	....	.....	....	....	....
Continental	31.59	34.90	....	173.09	....	121.60	....	....	.....	.....	.....	.....	64.80	64.16	.....	....	....	....
Delta	34.39	38.22	63.60	60.20	86.61	88.03	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Eastern	....	37.62D	D	74.38	....	....	....	80.14I	.....	192.73	.....	.....	....	....	.....	....	....	....
		26.51C	I	68.15	....	....	....	88.21D	.....	.....	.....	.....	....	....	.....	....	....	....
Empire	44.14	81.51	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Frontier	....	43.05	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Hawaiian	....	43.46D	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
	....	42.19C	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Lake Central	40.25	42.1	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	43.90	....
Mid-Continent	31.90	34.72	....	....	....	....	....	....	.....	.....	.....	.....	70.33	74.349	.....	....	....	....
Mid-West*	....	....	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
National	....	....	67.16	73.57I	77.71	84.53I	....	....	.....	.....	.....	.....	....	....	.....	....	49.80	56.75
Northeast	48.08	45.65	167.46	....	....	....	....	....	.....	.....	.....	.....	89.46	98.59	79.78	....	....	....
Northwest	....	67.93	63.69	83.53I	....	....	....	....	.....	.....	178.27	211.29I	....	....	.....	....	....	....
	....	....	....	81.35D	....	....	....	....	.....	.....	.....	171.94	....	....	.....	....	....	....
Ozark	....	56.98	....	....	....	....	....	....	.....	.....	.....	....	....	....	.....	....	....	....
Pan American	....	....	....	.98I	....	....	....	....	.....	.....	.....	1.91	....	....	.....	....	....	....
Piedmont	43.09	40.75	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Pioneer	37.23	....	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Robinson	....	52.4	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Slick	....	....	....	....	(DC-6A)	71.00	....	....	.....	.....	.....	.....	....	....	.....	....	36.11	39.00
Southern	....	46.17	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
South West	34.69	40.07	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Trans Pacific	....	40.84	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Trans Texas	36.48	38.51	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
TWA	38.97	40.22	96.54	....	....	....	....	94.62	101.05	.....	.....	.....	....	....	90.82	....	....	....
United	60D	39.50	98D	63.83	102	81.88	89.06	....	....	.....	246	190.39	....	....	.....	....	....	....
	59C	42.77	80C	65.96	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
	....	....	71.26	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Western	32.41	....	71.26	....	....	....	....	....	.....	.....	.....	.....	55.09	....	.....	....	....	....
West Coast	43.93	36.47	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Wisc. Central	....	48.45	....	....	....	....	....	....	.....	.....	.....	.....	....	....	.....	....	....	....
Calif. Central	....	27.89	....	.9125	....	....	....	....	.....	.....	.....	.....	....	....	.6308	....	....	....

* Cessna 190-18c

Symbols: D—Domestic passengers I—International passengers C—Cargo

Source: American Aviation Survey

Direct Costs Rise, Take Indirect With Them

Mild 1951 increases foreshadow worse news for 1952 budgets as price ceilings go off parts, fuel and oil.

COSTS are going up, but it is difficult to compare costs, airline to airline. Even when using "standard" accounting procedures there are variations in accounting that show two airlines of comparable efficiency as having appreciably different costs. The trend in costs is apparent in the more than 20 instances shown here where the direct operating cost per plane-mile increased during 1951.

1952 Worse

The 1951 cost increases are mild compared to those that can be expected during 1952. Biggest single factor in this trend will be the removal of price ceilings on most of the aircraft and engine parts, fuel and oil, etc. Since these ceilings were removed many items of prime importance and with relatively high turnover rates have gone up 15-25%. Normally, existing stocks would cushion the operators for some time against these increases, but sudden increase in lead times (the time between ordering and delivery of parts) since the start of the Korean conflict has virtually depleted most such surpluses.

The DOC increases in 1951 ranged from one cent per plane-mile upward, but increases of three to five cents were quite prominent. On the surface this appears as a small figure, but direct operating costs bear a close, although not direct, relationship to over-all costs, it being considered normal for direct and indirect costs to be about equal. This would mean that the same factors that forced DOC up would also move indirect costs in the same direction, raising the increase to 6-10 cents.

Productivity Up

Direct operating costs include costs of flight crews and certain ground crews. Productivity of airline employees is up (see chart, page 115) over seven percent. It might be assumed that increased productivity, in available ton-miles payload produced, would offset these increased costs. While this has some significance the productivity is largely related to the increased efficiency of the new types of aircraft operated. Where costs have risen per plane-mile for the same plane, operated by the same airline in two successive years, increased productivity is largely a matter of employee effort and is relatively small.

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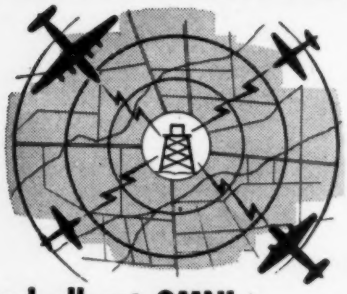
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1951 Airline Gas-Oil Consumption

Domestic

Carrier	Fuel (Gallons)	Oil (Gallons)	Total Cost (Fuel & Oil Combined)
American	111,740,395	1,627,271	$17,959,766
Braniff	13,188,741	158,739	2,136,399
Capital	29,584,032	261,883	5,294,247
Caribbean	475,940	4,268	102,603
C & S	9,206,363	94,964	1,529,214
Colonial	3,494,921	35,137	622,067
Continental	5,854,124	74,985	1,012,813
Delta	18,348,245	237,524	3,212,465
Eastern	66,436,878	677,744	11,572,604
Hawaiian	2,083,106	30,338	341,221
Inland	2,166,910	24,474	345,622*
Mid-Continent	6,804,622	70,535	1,172,139
National	18,361,365	197,150	3,356,914
Northeast	4,019,761	62,332	751,243
Northwest	23,498,539	260,449	4,244,399
TWA	69,897,852	701,817	11,262,809
Trans-Pacific	905,230	9,480	148,982
United	81,479,737	778,225	12,975,188
Western	8,189,078	113,945	1,207,696*
Total	**475,735,839**	**5,421,250**	**$79,248,391**

International

American	4,642,440	60,310	$ 806,640
Braniff	5,016,310	49,166	1,271,525
C & S	2,776,514	30,981	582,611
Colonial	1,002,155	14,445	202,617
Eastern	5,120,148	70,127	830,298
National	1,817,984	19,684	325,125
Northwest	9,145,215	114,297	1,910,311
PAA-Atlantic	32,703,285	360,190	10,086,432*
LAD	38,981,254	354,167	8,759,040*
Pacific	20,165,555	222,546	4,630,900*
Alaska	3,852,641	59,203	929,796*
Panagra	7,346,618	71,687	1,887,908*
TWA	23,565,950	226,376	5,787,227
United	7,287,662	83,520	1,332,480
Total	**163,423,731**	**1,736,699**	**$39,342,910**

All-Cargo

Flying Tigers	6,976,194*	79,277	$ 1,116,391
Slick	11,192,175	128,833	1,860,869
U. S. Airlines	(NA)	(NA)	172,618
Total	**18,168,369**	**208,110**	**$ 3,149,876**

Local Service

Airnews	194,522	2,344	$ 31,098
All-American	2,568,375	27,930	478,430
Bonanza	619,810	8,534	130,000*
Central	979,948*	18,073*	178,649*
Empire	988,997	12,626	169,810
Frontier	3,267,850	34,079	619,952
Helicopter A.S.	94,321	599	18,798
Lake Central	840,591	7,593	144,422
LAA	155,910	3,260	26,153
Midwest	104,960	2,183	32,572
Ozark	1,699,212	22,297	285,465
Piedmont	2,912,751	44,103	540,605
Pioneer	2,769,542	36,423	453,464
Resort	3,450,795	62,240	823,407
Riddle	1,175,820	18,779	297,644
Robinson	1,154,451	10,266	230,651
Southern	2,148,058	30,247	433,856
Southwest	1,885,712	21,955	291,418
Trans-Texas	2,040,379	29,677	371,262
West Coast	979,368	9,696	141,422
Wiggins	153,749	2,150	35,260
Wis. Central	1,313,839	14,303	240,342
Total	**26,292,843**	**329,205**	**$4,405,591**
GRAND TOTAL	**677,685,118**	**7,595,264**	**$126,146,768**

NA Not Available * *Estimated* *Source: American Aviation Survey*



Canadair-built . . . sleek F 86 Sabre jets . . . luxurious four-engined airliners.*

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Engine Overhaul Times Continue to Lengthen

VIRTUALLY all the aircraft engines in airline service today are operating with approved overhaul times ranging from 1,000 to 1,500 hours. These approved overhaul periods, combined with the low failure rates on aircraft engines in this type service, are a tribute to the reliability of the standard U. S. engines and to the quality of the maintenance and overhaul activities carried on by the airlines.

Few pieces of machinery rival the current day aircraft engine for complexity and precision. Add to this the severe operating conditions imposed on the engine, and the steady climb in approved overhaul times, year in and year out, is surprising. It is all the more surprising because these are not simply approved times. Checks with the individual operators show that virtually the entire authorized period is used. In one airline, for instance, maintenance must receive the personal approval of the operations vice-president before removing an engine which has more than five hours of allowable operating time still on it.

Allowable engine overhaul times are moving ahead at a pace where it may yet be possible to operate engines "on condition," changing them to suit maintenance and operations requirements. During the postwar years many other operating units have been moved to the "on condition" category. Eventually, economic rather than safety considerations may determine the length of overhaul periods.

Engine Overhaul Periods in Hours

For U. S. Aircraft in Scheduled Operation—1951

	Pratt & Whitney								Wright Aeronautical			
	R-1830		R-2000		R-2800		R-4360		R-1820		R-3350	
Operator	1950	1951	1950	1951	1950	1951	1950	1951	1950	1951	1950	1951
All American	-90D 1,000	-92 1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
American	.....	.....	.....	2SD13G 1,400	.....	-83AM3 1,100 -83AM3 1,400 CB16 1,000	.....	.....	.....	.....	.....	.....
Bonanza	-92 1,000	-92 1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Braniff	-92 1,000	S13CG 1,000	 1,200	.....	 1,000	.....	.....	.....	.....	.....	.....	.....
Capital	.....	.....	-7 1,200	-7M2 1,300	.....	.....	.....	.....	C9HE 1,100 G-202A 1,100	C9HE 900 G-202A 1,200	BA-3 900	BA-3 1,000
Central	-92 800	-92 1,000	.....	.....	.....	.....	.....	.....	.....	G-202A 1,200	.....	.....
C&S	-90D 1,050	.....	-9M3 1,100	.....	.....	.....	.....	.....	C9GC 1,250 C9HD 1,300	C9G6C 1,350	BD-1 1,100	BD-1 1,400
Colonial	.....	.....	-11C 1,200	-11M-1 1,300	.....	.....	.....	.....	G-102 1,125	G-102 1,225	.....	.....
Continental	-92 1,250	 1,250	.....	.....	CA-18 1,000	.....	.....	.....	.....	.....	.....	.....
Delta	.....	.....	-9M3 1,200	M4 1,250	CA-15 1,200	CA-15 1,250	.....	.....	G-202A 1,200	G-202A 1,250	.....	.....
Eastern	.....	.....	D5-7 1,300 -7 1,100	.....	.....	.....	.....	.....	G-202A 1,200	.....	BD-1 1,225	.....
Empire	.....	-90D 1,050	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Flying Tiger	.....	.....	-7 1,200	.....	-75 1,000	.....	.....	.....	.....	.....	.....	.....
Frontier	S1C3G 900	-92 1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hawaiian	.....	-92 1,100	.....	.....	.....	.....	.....	.....	G-202A 1,150	.....	.....	.....
Lake Central	-90D 700	-90D 800	.....	.....	.....	-75 700	.....	.....	.....	.....	.....	.....
Mid Continent	.....	-92 1,150	.....	.....	.....	CA-18 1,000	.....	.....	.....	.....	.....	.....
National	.....	.....	D-3 1,300	D-3 1,500	CA-15 1,100	CA-15 1,300 -B 900	.....	.....	.....	202-A 1,250	.....	.....
Ozark	.....	-90D 900	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northeast	-92 1,100	-92 1,200	.....	.....	CA-18 1,100	CA-18 1,100 CA-3 1,100	.....	.....	.....	.....	.....	.....
Northwest	.....	-90D 900	 1,500	-B 1,500	 1,400	CA-18 1,100 CA-3 1,100	TSB-3G 900	TSB3G 1,000	.....	.....	.....	.....



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Engine Overhaul Periods

(Continued from page 93)

Operator	Pratt & Whitney R-1830 1950	Pratt & Whitney R-1830 1951	Pratt & Whitney R-2000 1950	Pratt & Whitney R-2000 1951	Pratt & Whitney R-2800 1950	Pratt & Whitney R-2800 1951	Pratt & Whitney R-4360 1950	Pratt & Whitney R-4360 1951	Wright Aeronautical R-1820 1950	Wright Aeronautical R-1820 1951	Wright Aeronautical R-3350 1950	Wright Aeronautical R-3350 1951
Pan American (Pacific Div.)	.....	.....	.....	D3 -9M1 -11M2 -9M3 1,500	.....	.....	.....	TSB3G 900	.....	.....	.....	.....
Piedmont	-90D 1,000	-92 1,000	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pioneer	.....	-90D 1,100	.....	.....	.....	.....	.....	.....	G-102 1,000	.....	.....	.....
Robinson	.....	.....	.....	.....	.....	.....	.....	.....	.....	-71 & -75 1,000	.....	.....
Slick	.....	.....	.....	.....	-75 1,000	CB-16 1,000	.....	.....	.....	.....	.....	.....
Southern	.....	S4C4G 1,100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Southwest	.....	-92 1,100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trans Pacific	.....	-92 1,100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trans Texas	-90D 1,000	-90D 1,100	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
TWA	S1C3G 1,500	S1C3G 1,500	-9 1,500	.....	CB-16 900	CB-16 1,000	.....	.....	C9GC 1,500	.....	BD-1 1,400 BA-3 1,100	BD-1 1,500 BA-3 1,100
United	S1C3G 1,300	-92 1,400	-11C 1,500	-11 1,300	CA14-15 1,400	CA-15 1,500 CB-16 1,000	TSB3G 800	TSB3G 800 B-6 800	.....	.....	.....	.....
Western	S1C3G 1,300	S1C3G 1,300	-11C 1,100	.....	-75 1,200	-75 1,300	.....	.....	.....	.....	.....	.....
West Coast	-92 950	-92 1,150	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisc. Central	.....	.....	.....	.....	.....	.....	.....	.....	.....	G-202A 700	.....	.....
Calif. Central	.....	-92 1,000	.....	-13 1,200 -7 1,000 -9M-3 1,200	.....	CA18 1,100	.....	.....	.....	.....	.....	.....
Canadian Pacific	.....	-92 1,100	.....	-11 1,025 -7 1,000	.....	.....	.....	.....	.....	.....	.....	.....
U.S. Overseas	.....	.....	.....	-7-11 1,000	.....	.....	.....	.....	.....	.....	.....	.....

Source: American Aviation Survey

Establishment of Air Navigation Facilities

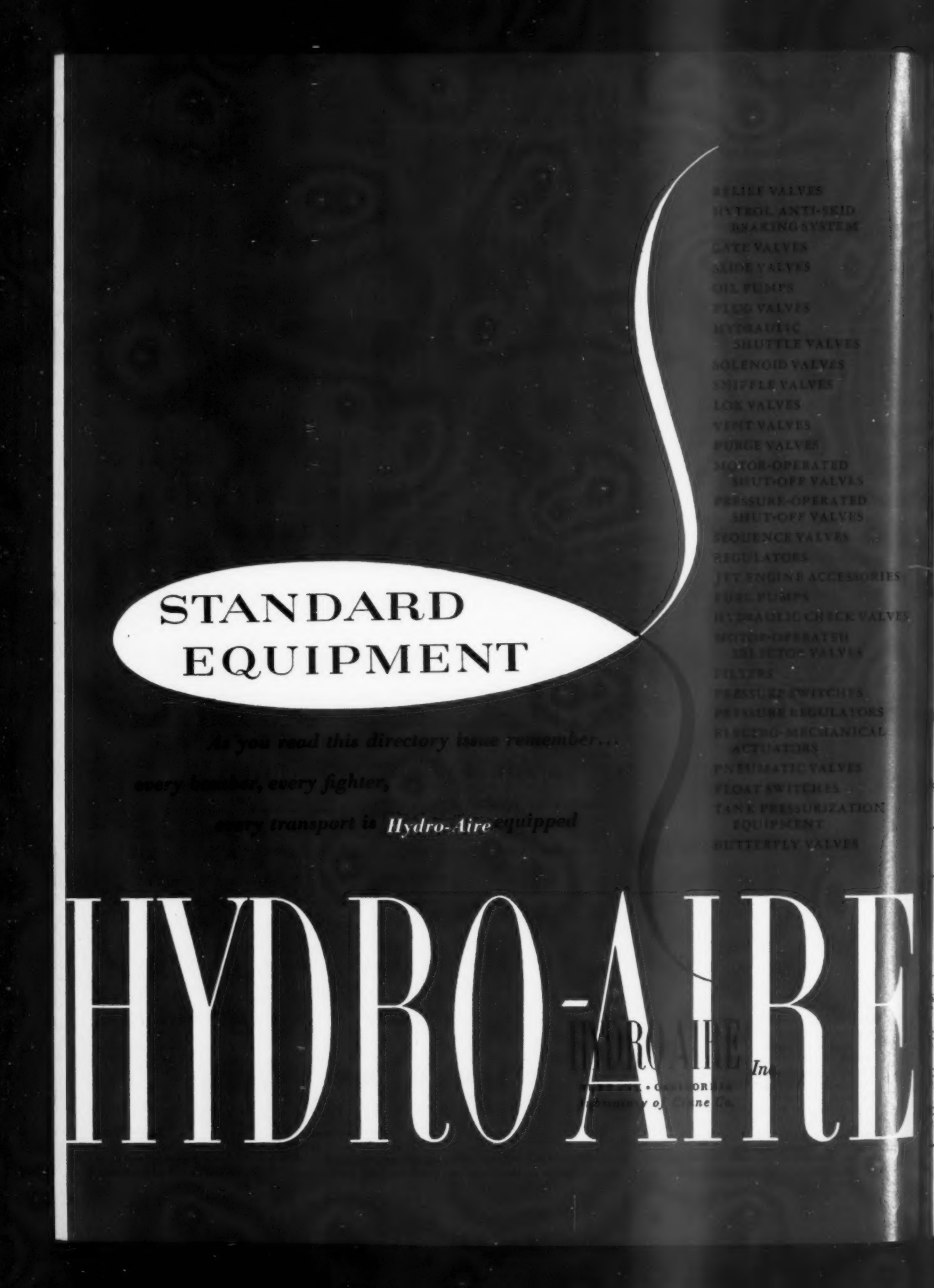
Status of Major Programs

AS OF JANUARY 31, 1952

Program	Symbol	Unassigned REGION 1-7	Unassigned REGION 8-9	Underway REGION 1-7	Underway REGION 8-9	Operating On Test REGION 1-7	Operating On Test REGION 8-9	Commissioned to Date REGION 1-7	Commissioned to Date REGION 8-9	Total Program Thru F.Y. 1952 REGION 1-7	Total Program Thru F.Y. 1952 REGION 8-9
VHF Visual-Aural Ranges	VAR	0	0	0	0	0	0	33	0	33	0
VHF Omniranges	VOR	12	0	38	0	7	1	348	6	405	7
Instrument Landing Systems	ILS	7	0	62	5	2	0	97	1	168	6
Hi-Intensity Approach Light Lines	HY	0	0	11	1	0	0	22	6	33	7
Airport Surveillance Radar	ASR	0	0	42	2	0	0	10	0	52	2
Precision Approach Radar	PAR	0	0	13	1	0	0	10	0	23	1
Distance Measuring Equip./ILS	DME/ILS	17	0	0	0	3	0	0	0	20	0
Distance Measuring Equip./VOR	DME/VOR	404	7	11	0	11	0	0	0	426	7
Airport Traffic Control Towers	ATCT	0	0	14	1	0	0	146	9	160*	10
VHF Automatic D. F. Equipment	VHF/ADF	1	0	56	2	0	0	0	0	57	2
Mechanical Interlock Equipment	MI	6	0	12	0	0	0	18	0	36	0
Combined Tower/Station		19	0	25	0	0	0	20	0	64	0

**Includes 24 commissioned towers assigned for conversion to combined tower/stations.*

Source: Civil Aeronautics Administration


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PRESSURE REGULATORS
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Commercial Transport Specifications

Manufacturer and Type	Power Plant	Max. Takeoff Ratings	Dimensions Span	Length	Height	Maximum Gross Takeoff Weight	Speed	Seats
Aero Design & Eng'g Co.								
Commander	2 Lycoming GO-435-C2	260 h.p.	44'	34'	13'6"	5,400 lbs.	197 m.p.h.	5-7
Beech Aircraft Corp.								
Beech 18	2 Pratt & Whitney R-985	450 h.p.	47'7"	33'11"	9'2"	8,750	211 m.p.h.	10
Beech T-50	2 Lycoming GO-435-C2	260 h.p.	45'3½"	31'6½"	11'4"	5,500	190 m.p.h.	6
Bellanca Aircraft Corp.								
Cruisemaster	Lycoming O-435A	190 h.p.	34'2"	23'	6'2½"	2,600	180 m.p.h.	4
Boeing Airplane Co.								
Boeing B-377	4 Pratt & Whitney R-4360	3,500 h.p.	141'3"	110'4"	38'3"	148,000	330 m.p.h.	61+12
Cessna Aircraft Co.								
Cessna T-50	2 Jacobs L-4MB	245 h.p.	4'11"	32'9"	9'11"	5,000	191 m.p.h	5
Consol. Vultee Aircraft Corp.								
Convair 240	2 Pratt & Whitney R-2800-CA-18	2,400 h.p.	91'9"	74'8"	26'11"	40,500	290 m.p.h	40
Convair 340	2 Pratt & Whitney R-2800-CB-16	2,400 h.p.	105'8"	79'2"	27'9"	46,795	290 m.p.h	44
Curtiss Aircraft Div.								
Curtiss C-46	2 Pratt & Whitney R-2800-CA-75	2,400 h.p.	108'	76'4"	22'	48,000	222 m.p.h	48-50
Douglas Aircraft Co.								
Douglas DC-3	2 Pratt & Whitney R-1830	1,200 h.p.	95'	64'5"	16'11"	25,900	180 m.p.h.	21-30
Super DC-3	Wright Aero R-1820's	1,475 h.p.	90'	67'8"	18'3"	31,000	250 m.p.h	24-28
Douglas DC-4	4 Pratt & Whitney Twin Wasp 2SD13-G	1,450 h.p.	117'6"	93'11"	27'6 5/16"	73,000	245 m.p.h	44-60
Douglas DC-6	4 Pratt & Whitney Double-Wasp R-2800-CA's	2,400 h.p.	117'6"	100'7"	28'5"	97,200	300 m.p.h.	52
Douglas DC-6A	4 Pratt & Whitney R-2800-CB-17	2,500 h.p.	117'6"	106'6"	28'8"	100,000	313 m.p.h.	Cargo
Douglas DC-6B*	4 Pratt & Whitney R-2800 CB-17	2,500 h.p.	117'6"	106'6"	28'8"	100,000	313 m.p.h.	52-58
Douglas DC-7	4 Wright R-3350 927TC18DA1	3,250 h.p.	117'6"	108'11"	28'8"	116,800	360 m.p.h.	66-95
Lockheed Aircraft Corp.								
Lockheed 049	4 Wright R-3350 BA	2,500 h.p.	123'	95'1 3/16"	23'	90,000	300 m.p.h.	44-52
Lockheed 649	4 Wright Cyclone 749C18-BD1	2,500 h.p.	123'	95'1 3/16"	23'	94,000	300 m.p.h.	44-52
Lockheed 749	4 Wright Cyclone GR-3350-BD1	2,500 h.p.	123'	95'1 3/16"	23'	105,000	300 m.p.h.	44-52
Lockheed 1049A	4 Wright R-3350C18CA-1	2,700 h.p.	123'	113'	23'	120,000	327 m.p.h.	80-92
Lockheed 1049C	4 Wright R3350-972TC18DA1	3,250 h.p.	123'	113'	23'	130,000		
Lockheed 18	2 Wright GR1820G202	1,200 h.p.	65'6"	49'9¾"	11'10½"	18,500	241 m.p.h.	8-10
The Glenn L. Martin Co.								
Martin 2-0-2	2 Pratt & Whitney R-2800-CB16	2,400 h.p.	93'3"	71'4"	28'5"	42,750	286 m.p.h.	36
Martin 4-0-4	2 Pratt & Whitney R-2800-CB16	2,400 h.p.	93'3"	71'4"	28'5"	43,650	280 m.p.h.	40
Piper Aircraft Corp.								
Piper Twin Stinson	2 Lycoming O-290-D-2	135 h.p.	34'	23'	91"	3,200	150 m.p.h.	4

Source: American Aviation Survey

Military Transport Specifications

Manufacturer and Type	Power Plant	Maximum Take-off Ratings	Dimensions Span	Length	Height	Maximum t-o gross wt.	Speed	Passenger or cargo Capacity
Beech C-45A-F "Expediter"	two Pratt & Whitney R-985-AN-1 or AN-3	Approx. 450 h. p.	47' 6"	34' 2"	9' 3"	Approx. 8800 lbs.	225 mph top	5 passengers
Curtiss C-46F "Commando"	two Pratt & Whitney R-2800-75	2000 h. p.	108'	76' 3"	21' 7"	55,000 lbs.	250 mph	12,000 lbs. cargo or 50 troops
Douglas C-47D "Sky Train"	two Pratt & Whitney R-1830-90D	1200 h. p.	95'	63' 8"	16' 9"	33,000 lbs.	200 mph	7,500 lbs. cargo or 21 passengers
Douglas C-54G "Skymaster"	four Pratt & Whitney R-2000-9	1450 h. p.	117' 6"	93' 5"	27' 6"	82,500 lbs.	Approx. 300 mph top	31,700 lbs. or 49 troops

(Continued on page 98)

Military Transport Specifications (Continued from page 97)

Manufacturer and Type	Power Plant	Maximum Take-off Ratings	Dimensions			Maximum t-o gross wt.	Speed	Passenger or cargo Capacity
			Span	Length	Height			
Douglas C-74 "Globemaster" I	four Pratt & Whitney R-4360-49	3250 h.p. (dry) 3500 h.p. (wet)	173' 3"	124' 2"	43' 9"	165,000 lbs.	Over 300 mph	50,000 lbs. max. cap. or 125 troops
Fairchild C-82 "Packet"	two Pratt & Whitney R-2800-85	2100 h.p.	106' 5"	77' 1"	26' 3"	54,000 lbs.	250 mph top and 170 mph cruising	24,000 lbs. max. or 42 troops plus 15 paratainers
Fairchild C-119B and C "Packet"	two Pratt & Whitney R-4360-20W	3250 h.p. (dry)	109' 4"	86' 6"	26' 8"	74,000 lbs.	Over 250 mph	Over 30,000 lbs. or 62 paratroopers
Boeing C-97A-C "Stratofreighter"	four Pratt & Whitney R-4360-35A	3250 h.p. (dry)	141' 3"	110' 4"	38' 3"	153,000 lbs. normal 175,000 lbs. max.	Over 350 mph	68,500 lbs. max. cargo or 130 troops
Convair XC-99 Cargo-Transport	six Pratt & Whitney R-4360-41	3250 h.p. dry pusher type	230'	182' 6"	57' 11"	310,000 lbs. max. T. O.	Approx. 300 mph	100,000 lbs. max. cargo or 400 troops
Fairchild XC-120	two Pratt & Whitney R-4360-20W	3250 h.p. (dry)	Approx. 109' 4"	83'	24' 11"	70,000 lbs.	Over 250mph	Approx. 24,000 lbs. or 66 troops
Lockheed C-121A & B "Constellation"	four Wright R-3350-75	2500 h.p.	123'	95' 4"	23'	Approx. 135,000 lbs.	350 mph top	43,300 lbs. max. or 44 passengers
Chase YC-122A-B-C	two Wright R-1820-101	1425 h.p. (dry)	86' 4"	56' 7"	21' 3"	Over 30,000 lbs.	Max. 220 mph Cruise at 220 mph	12,000 lbs. or 30 troops
Chase C-123	two Pratt & Whitney R-2800-83	2100 h.p.	110'	77' 1"	32' 8"	Over 54,000 lbs.	Max. over 230 mph Cruise over 200 mph	20,000 lbs. or 60 troops
Douglas C-124A "Globemaster" II	four Pratt & Whitney R-4360-20W	3250 h.p. (dry)	173' 4"	127' 1"	48' 4"	210,000 lbs.	Over 300 mph	74,000 lbs. max. cargo or 100 paratroopers
Douglas YC-124B	four Pratt & Whitney VT-34-P-1 turboprop	5500 h.p.				200,000 lbs. designed gross		75,000 lbs. or 200 men with equipment
Lockheed XC-130	four turboprop Allison engines							
Northrop YC-125 A, B "Raider"	three Wright R-1820-99	1200 h.p. (dry)	86' 6"	67' 2"	23' 1"	Over 40,000 lbs.	Approx. 200 mph	Approx. 3,000 lbs. or 32 troops
Douglas C-118A	four Pratt & Whitney R-2800-52W	2100 h.p. (d.s.t.)	117' 6"	106' 10"	28' 8"	103,000 lbs.	360 mph	60 litters and 8 attendants
Cessna LC-126	one Jacobs No military designation	300 h.p.	36' 2"	27' 2"	7' 2"	3,300 lbs.	180 mph	4/5 seats
de Havilland YL-20 "Beaver"	one Pratt & Whitney R-985	450 h.p.	48'	30' 4"	9'	4,820 lbs.	180 mph	1,000 lbs. cargo or 6 passengers

Source: American Aviation Survey

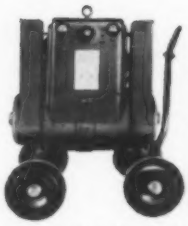
Crew Utilization

Airline	Captains	Co-Pilots	Flight Engineers
All American	....	....	....
American	....	....	....
Bonanza	93	93	....
Capital	94.11	91.72	92.95
Central	95	95	....
Chicago & Sou.	....	....	....
Colonial	90.9	88.8	....
Continental	95.8	95.8	95.8
Delta	....	....	....
Eastern	94.1	84.7	75.3
Empire	90.5	92.9	....
Frontier*	82	82	....
Hawaiian	....	....	....
Lake Central	98	85	....
Mid-Continent	(79.30 (93.53	(74.35 (87.46	....
Mid-West	87	....	....
National	....	....	....
Ozark*	61.07	58.73	....
Northwest*	73.32	69.21	62.34
Northeast*	65.13	65.13	....
Pan Am Pac. Div.	90.7	89.3	89
Panagra	101	96	96
Piedmont	91.2	88.9	....
Pioneer	95	87	....
Slick	90.7	86.5	89.2
Southern	93.6	89.2	....
Southwest	89	88	....
Trans Pacific	95	83.4	....
Trans Texas	91.7	89	....
United	93.5	85.9	82.8
West Coast	91.5	91.5	....
Wisconsin Cent.	98	96	....
Calif. Central	95	87	....
U.S. Overseas	85**	85**	....

Source: American Aviation Survey

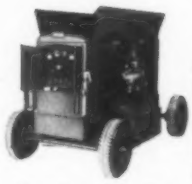
** Based on 100 hours; balance based on ALPA 85-hour limit ** Approximate*

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- ☐ Jet Starting Controls
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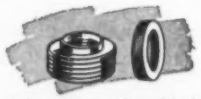
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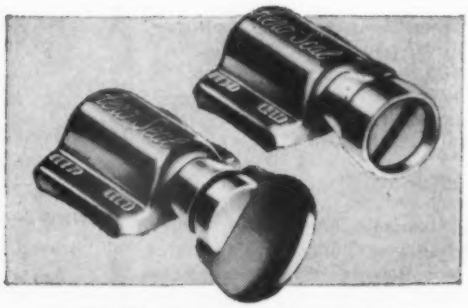
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Aircraft Seating Figures

Airline	DC-3	DC-4 Coach	DC-4 Reg.	DC-4 S1	DC-6 Coach	DC-6 Reg.	DC-6B Coach	DC-6B Reg.	Lockheed 749 Coach	Lockheed 749 Reg.	Boeing 377 Coach	Boeing 377 Reg.	Convair 240	Convair 340	Martin 202	Martin 404
All American	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
American	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Bonanza	28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	Super	55	50													
Capital	24 31	60	.....	.....	.....	.....	.....	.....	55	55	.....	.....	.....	.....	.....	.....
Central	24 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago & Sou.	.. ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Colonial	26 ..	.....	52	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Continental	21 ..	.....	.....	.....	.....	52	.....	.....	.....	.....	.....	.....	40	.....	.....	.....
Delta	25 ..	51	48	.....	.....	56	.....	.....	.....	(1049)	.....	.....	.....	.....	.....	.....
Eastern	21 ..	60	60	.....	.....	.....	.....	.....	60	88	.....	.....	.....	.....	.....	40
Empire	24 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Frontier	24 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Hawaiian	.. ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Lake Central	21-25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mid-Continent	21-24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40	.....	.....	.....
National	14 ..	.....	50	.....	58	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ozark	25 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Northwest	21 ..	58	50	(Int)32	.....	.....	.....	.....	.....	.....	75	.....	.....	.....	.....	.....
Northeast	24 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	40	.....	.....
Pan Am Lat Am	.. ..	55	44	30	.....	.....	.....	.....	.....	.....	.....	61	.....	.....	.....	.....
Panagra	21 ..	.....	46	.....	52	40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Piedmont	21 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pioneer	24 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Robinson	24 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Southern*	6@21	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	4@24	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Southwest	2@27	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	8@28	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Trans Pacific	28 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44	.....	.....
												(night)				
Trans Texas	21 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	56	52	.....	.....	.....	.....
United	28 21	66	44	.....	50	.....	58	.....	.....	.....	.....	.....	.....	.....	.....	.....
West Coast	24 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wisconsin Cen.	21 ..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44	.....
Calif. Central	30 ..	.....	50	68	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
U. S. Overseas	.. ..	.....	65	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* *All 24 by July, 1952*

Source: American Aviation Survey

High-Density Seating Made Coaches Possible

Rising costs have had a significant effect on the physical arrangements in today's transport aircraft. One of the more obvious aspects has been changes in the number of passenger seats. In an attempt to improve the revenue-producing potential of their aircraft, the airlines have revised the once standard interior arrangements to fit a wide range of traffic requirements.

Different Meanings

A 50% passenger load factor in some of today's airline DC-3's means 10.5 passengers, as it did 15 years ago. In other DC-3's the same 50% passenger load factor would mean 15 passengers. By cutting down lavatory size, using narrow seats, relocating baggage space, and rearranging coat rooms, the airlines have greatly increased the available passenger-miles produced by their transports.

The trend, which first appeared to be a means of off-setting rising costs, today has a much more significant role. It is the high-density aircraft, the one with a large number of seats for a given volume, that has made practical the tourist or coach fares.



Air-Rail Comparison, January-December, 1951

		Rail Revenue Passenger-Miles (Thousands)	Air Revenue Pass.-Miles (Thousands)	% Air to Rail	Pullman Rev. Pass.-Miles (Thousands)	% Air to Pullman	Rail Passenger Revenues	Air Passenger Revenues	% Air to Rail
Jan.	1951	2,557,883	759,000	29.6	1,106,759	68.5	$70,769,266	$42,115,112	59.5
	1950	2,278,877	487,779	21.4	873,579	55.8	62,884,942	32,153,755	51.1
Feb.	1951	2,023,443	696,310	34.4	851,477	81.7	57,414,675	38,757,038	67.5
	1950	1,814,240	487,989	26.8	705,281	69.1	51,624,249	27,498,148	53.2
Mar.	1951	2,305,097	872,769	37.8	905,123	96.4	63,772,956	48,646,007	76.2
	1950	1,870,838	574,912	30.7	718,310	80.0	52,892,712	32,337,749	61.1
Apr.	1951	2,157,434	871,000	40.3	820,116	106.2	59,677,277	48,757,694	83.2
	1950	1,949,617	645,770	33.1	668,892	96.5	54,027,405	36,001,578	66.6
May	1951	2,237,568	897,287	40.1	774,033	115.9	63,807,868	50,348,495	78.8
	1950	1,782,226	693,302	38.9	582,838	118.9	49,932,468	38,407,310	76.9
June	1951	2,707,058	968,125	35.7	868,855	111.4	73,949,387	53,811,743	72.7
	1950	2,438,373	792,825	32.6	773,012	102.5	65,370,636	43,451,217	66.4
July	1951	2,787,379	955,260	34.2	801,933	119.1	73,621,636	52,929,290	71.8
	1950	2,636,569	754,942	28.6	785,472	96.1	69,624,902	41,071,998	58.9
Aug.	1951	2,902,437	1,000,687	35.6	829,638	120.6	77,153,590	55,646,850	72.1
	1950	2,729,593	784,383	28.7	892,023	87.9	71,729,186	42,422,951	59.1
Sept.	1950	2,530,748	976,302	38.6	809,436	120.6	67,387,150	54,607,217	81.0
	1950	2,417,011	757,373	31.3	853,038	88.8	65,110,397	41,338,552	63.5
Oct.	1951	2,279,002	962,050	42.2	812,060	106.1	63,545,618	53,773,289	84.6
	1950	2,128,006	784,683	36.9	860,772	91.1	59,115,883	42,688,537	72.2
Nov.	1951	2,301,939	851,025	37.0	809,342	105.1	64,883,587	47,831,865	73.7
	1950	2,090,260	658,058	31.5	787,150	83.6	59,252,322	36,423,048	61.5
Dec.	1951	2,955,172	869,466	29.4	826,240	105.2	80,674,064	49,652,407	61.6
	1950	2,650,173	723,532	27.3	837,815	86.3	72,642,621	41,022,955	56.5
Totals	1951	29,747,635	10,679,281	35.9	10,224,714	104.4	817,029,146	596,877,007	73.5
	1950	26,780,959	8,145,548	30.4	9,338,180	87.2	734,417,233	454,817,798	61.9

Source: American Aviation Survey

1951 Air Travel Tops Pullman for 1st Time

Carriers gain 2,553,733,000 passenger miles over 1950 compared to 886,534,000 Pullman increase.

By KEITH SAUNDERS

THE nation's certificated airlines passed a virtually unnoticed but significant milestone on December 31, 1951. That date ended the first year in aviation history when scheduled air passenger-miles exceeded the total passenger-miles traveled in Pullman cars.

There had been occasional months in the past few years when air passenger-miles had topped Pullman, but 1951 marked the first time air travel had done so for a full calendar year.

4.4% Greater

The comparative figures, as compiled from official reports filed with the Interstate Commerce Commission and the Civil Aeronautics Board were:

Pullman	10,224,714,000
Airline*	10,679,281,000

The percent of air to Pullman traffic for the year was 104.4%, compared with 87.2% in 1950, when air volume totaled 8,145,548,000 passenger-miles and Pullman volume was 9,338,180,000 passenger-miles.

As far as percentages are concerned, the 2,533,733,000 passenger-mile gain of the airlines in 1951 over 1950 amounted to 31.1%, whereas the 886,534,000 passenger-mile increase of Pullman traffic proved to be only 9.5%.

Additional gains were made by the airlines last year in comparison with combined coach and first-class rail traffic (commutation excluded), according to ICC reports covering all the nation's Class I railroads. Total non-commutation rail traffic for the year amounted to 29,747,635,000 revenue passenger-miles, a gain of 11.1% over the 26,780,959,000 passenger-miles operated in 1950. The percent of air to rail traffic increased from 30.4% in 1950 to 35.9% last year.

In another category—passenger revenues—the airlines also registered impressive gains last year. Preliminary figures compiled from CAB reports indicate that passenger revenues of the certificated domestic trunk and local-service airlines for 1951 aggregated $596,877,007, an increase of 31.2% over the $454,817,798 of the previous year.

On the other hand, rail passenger revenues (including both coach and first-class, but not commutation) rose only 11.2% in the same period—from $734,417,233 in 1950 to $817,029,146 in 1951. The percentage of air passenger revenues to rail passenger revenues increased to 73.5% last year, as against 61.9% the year before.

* *Includes traffic of all certificated domestic trunklines and local-service airlines.*

Aircoach Revenues Top $56 Million in '51

PHENOMENAL growth of scheduled air coach services in this country continued during 1951 as revenues jumped more than $13,000,000 and passenger miles more than 200,000,000 over 1950 results. Total passenger coach revenue for the nine active operators last year was $56,556,942, or almost 10% of the total passenger revenue of the 16 domestic trunk carriers. In 1950, coach revenue was $43,407,701.

The trend is continuing in 1952,

1951 Domestic Air Coach Results

	Passengers		Passenger-Miles (000 omitted)		Available Coach Seat-Miles (000 omitted)		Revenue—1951		
	1951	1950	1951	1950	1951	1950	Passenger	Cargo (1)	Total
							$	$	$
American	102,133	59,672	178,569	103,165	206,087	129,860	7,924,718	218,529	8,143,247
Capital	217,909	205,000	109,641	109,458	174,267	176,153	4,906,057	467,361	5,373,418
Delta	56,225	46,453	47,560	43,430	69,620	54,495	2,127,572	53,222	2,180,794
Eastern (2)	357,208	290,323	291,824	269,359	498,973	336,646	13,539,388	293,618	13,833,006
National	102,253	72,163	97,109	72,235	147,897	102,592	4,548,412	236,914	4,785,326
Northwest	99,277	171,188	111,355	169,210	141,356	243,272	5,210,642	176,111	5,386,753
TWA	186,493	146,578	253,809	170,098	324,721	226,339	11,539,497	256,822	11,796,319
United	222,100	128,086	105,633	53,138	142,604	62,224	4,026,015	143,351	4,169,366
Western	174,906	140,097	73,922	64,450	97,303	83,541	2,734,641	105,185	2,839,826
Totals (3)	**1,518,504**	**1,259,560**	**1,269,422**	**1,052,633**	**1,802,828**	**1,415,122**	**56,556,942**	**1,951,113**	**58,508,055**

Notes: (1) Cargo revenue shown is that derived from cargo transported on coach flights only.
(2) Totals for Eastern include actual reported figures for first 11 months, 1951, and projected figures for December, 1951.
(3) Industry totals for 1950 do not include coach operations of Chicago and Southern which were discontinued November, 1950. C&S 1950 totals were: (a) 7,821 passengers; (b) 4,028,000 passenger-miles; and (c) 8,724,000 available coach seat-miles.
Source: Periodic airline reports to CAB on coach operations.

according to January and February reports filed with CAB. But full impact of various fare adjustments will not be known for several months.

Last year, 1,802,828,000 passenger miles were operated in domestic coach services as compared to 1,056,661,000 in 1950 and a far cry from the 252,739,000 flown in 1949.

Similarly, the number of total coach passengers carried increased to 1,518,504 last year from 1,267,381 in 1950 and 363,482 in 1949.

Eastern Air Lines, which has virtually blanketed its system with so-called "off-peak" coach operations, was an easy first in all statistical departments. Not counting San Juan coach services, Eastern's passenger revenue domestically exceeded $13.5 million, a gain of approximately $3 million in one year. It carried 357,208 passengers.

TWA, a big gun in the high-density transcontinental coach market, ranked second statistically with $11.5 million passenger revenues and 186,493 passengers.

American Airlines, confined solely to high-density transcontinental coach schedules, replaced Northwest as third-ranking carrier in the statistics with $7.9 million revenue and 102,133 passengers carried.

At the present time, CAB and the coach operators are at a sort of crossroads on future coach expansion plans. CAB wants more coach service and lower fares wherever possible. Airlines, faced with rising costs, generally want higher standard fares and in some cases, have reluctantly agreed to cutting coach fares.



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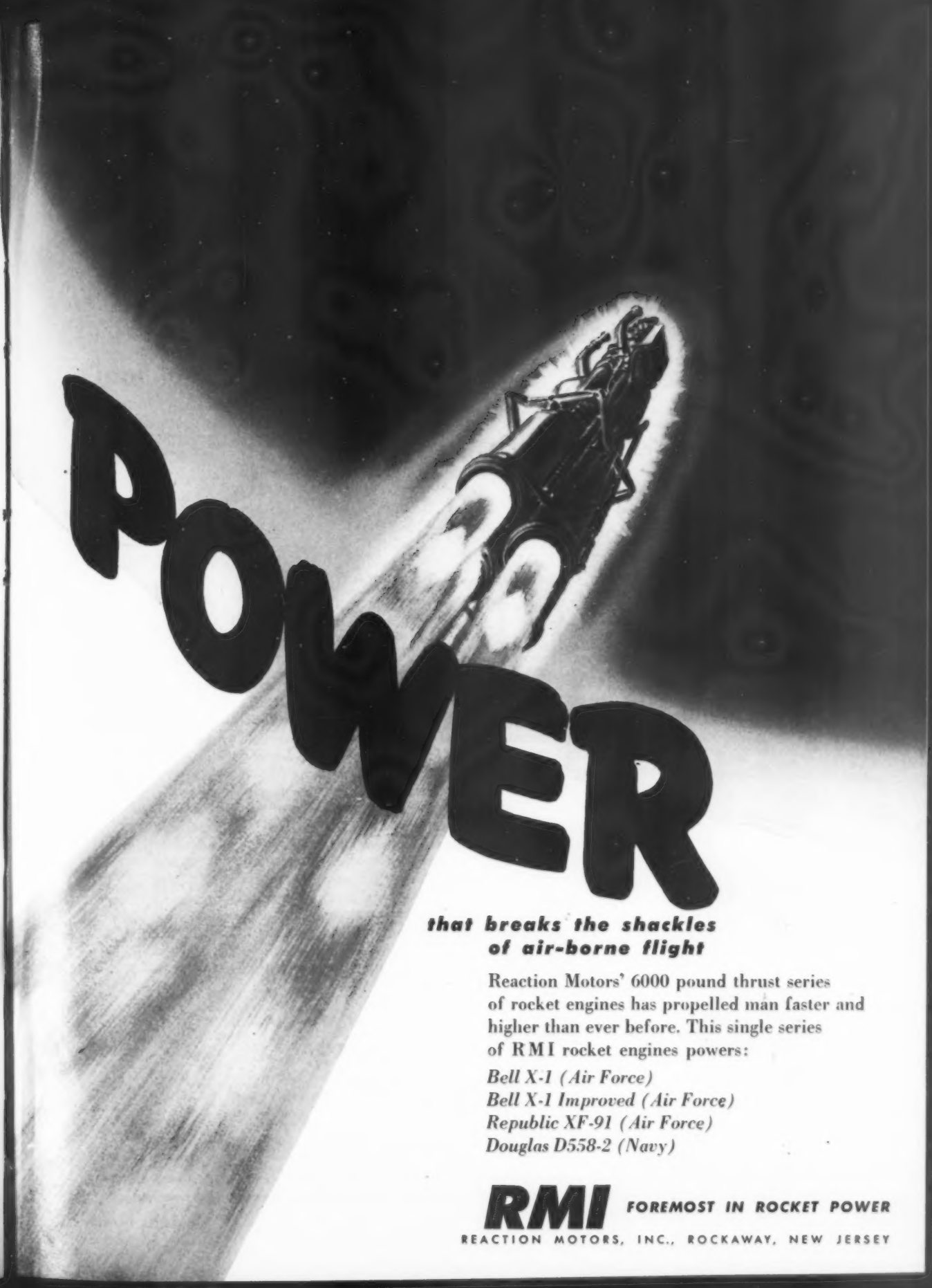
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Air Freight Tonnage Only 7% Greater in 1951

AIR FREIGHT volume of the domestic trunk airlines and the certificated all-cargo lines showed a gain of 7% in 1951 but in rate of growth it was disappointing for the first time in some years. Gains of 40% were registered in 1950 over the preceding year which was attributed to the combined stimuli of a booming civilian and defense economy and the availability of equipment. The slow-down or relative levelling off of air freight in 1951 was primarily due to a shortage of aircraft and an increase in inventories of industries.

But air express volume which has been threatened by the rapid expansion of air freight recorded a gain of some 9%, showing a surprising increase on a number of lines.

It was two out of the three scheduled all-cargo carriers — The Flying Tiger Line and Slick Airways—U. S. Airlines doing little business in 1951, that held up air freight volume, and accounted for almost 50% of the traffic. Counting common carriage and charter operations, Slick Airways operated a total of 67,890,612 freight ton-miles (company does not handle air express) for a gain of 44.8% over 1950 while Flying Tigers' traffic increase was 35.6% or 29,173,038 freight ton-miles flown. Broken down, Slick's total ton-mileage consisted of 44,151,350 ton-miles of air freight and 23,739,262 char-

Final 1951 Traffic Rankings of All U. S. Scheduled Airlines

Total Passengers . . . 24,844,151 **Cargo ton-miles . . . 217,642,332**

Rank	Airline	Revenue Passengers
1.	AA	4,954,236
2.	EAL	3,503,286
3.	UAL	2,888,938
4.	TWA	2,229,838
5.	Capital	1,951,356
6.	PAA	1,286,970
7.	Delta	887,224
8.	Braniff	806,657
9.	NWA	792,141
10.	NAL	738,894
11.	Western[2]	590,805
12.	C & S	480,534
13.	NEA	455,261
14.	MCA[3]	441,115
15.	Hawaiian	343,542
16.	CAL	291,385
17.	Colonial	286,134
18.	AAA	213,896
19.	Piedmont	189,831
20.	Pioneer	164,171
21.	Trans-Pac.	138,549
22.	SWA	137,821
23.	Panagra	118,960
24.	Frontier	104,792
25.	Robinson	103,696
26.	Inland[2]	100,517
27.	Southern	96,818
28.	Wis. Cen.	96,302
29.	Caribair	95,772
30.	W. Coast	78,876
31.	TTA	77,799
32.	Ozark	49,507
33.	Empire	44,658
34.	Central	35,303
35.	Lake Cen.	31,564
36.	Bonanza	30,216
37.	Wiggins	4,094
38.	Mid-West	2,693
	TOTALS	**24,844,151**

Rank	Airline	Rev. Pass. Miles (000 omitted)
1.	AA	2,558,244
2.	TWA	1,894,724
3.	UAL	1,868,768
4.	EAL	1,635,559
5.	PAA	1,571,735
6.	Capital	615,625
7.	NWA	604,814
8.	NAL	436,824
9.	Delta	406,507
10.	Braniff	335,347
11.	Western	218,933
12.	C & S	199,956
13.	MCA	132,442
14.	Panagra	127,784
15.	CAL	111,787
16.	Colonial	94,297
17.	NEA	87,694
18.	Hawaiian	44,508
19.	Piedmont	44,380
20.	Pioneer	43,891
21.	Inland	40,760
22.	AAA	30,689
23.	Frontier	28,015
24.	SWA	27,383
25.	TTA	18,455
26.	Southern	17,439
27.	Trans-Pac.	17,005
28.	Robinson	16,276
29.	Wis. Cen.	15,309
30.	W. Coast	11,930
31.	Empire	9,463
32.	Ozark	8,130
33.	Bonanza	7,716
34.	Caribair.	7,664
35.	Lake Cen..	6,176
36.	Central	5,263
37.	Mid-West	406
38.	Wiggins	382
		13,302,280

Rank	Airline	Mail Ton-Miles[1]
1.	UAL	19,094,986
2.	TWA	17,715,469
3.	PAA	16,291,989
4.	AA	15,528,193
5.	EAL	6,018,968
6.	NWA	4,571,276
7.	Capital	1,981,942
8.	Braniff	1,793,947
9.	Delta	1,743,916
10.	Western	1,242,877
11.	NAL	1,161,636
12.	Panagra	728,860
13.	C & S	716,380
14.	MCA	460,442
15.	CAL	405,016
16.	Inland	206,446
17.	NEA	155,703
18.	Colonial	136,288
19.	Frontier	127,808
20.	Pioneer	108,428
21.	Southern	86,011
22.	Piedmont	65,808
23.	SWA	62,909
24.	Wis. Cen.	60,292
25.	AAA	60,157
26.	TTA	50,766
27.	Hawaiian	36,466
28.	Robinson	28,373
29.	Empire	25,559
30.	Ozark	23,814
31.	Central	22,291
32.	Lake Cen.	15,276
33.	Trans-Pac.	11,323
34.	Caribair	10,715
35.	W. Coast	10,628
36.	Mid-West	9,501
37.	Bonanza	6,483
38.	Wiggins	1,352
		90,778,294

Rank	Airline	Express Ton-Miles
1.	UAL	9,881,945
2.	AA	8,937,664
3.	TWA	7,509,904
4.	EAL	4,876,136
5.	Capital	2,558,911
6.	Panagra	2,404,998
7.	NWA	2,031,780
8.	Delta	1,203,375
9.	Braniff	1,037,985
10.	C & S	763,611
11.	NAL	507,665
12.	Western	434,911
13.	MCA	315,686
14.	NEA	188,776
15.	CAL	166,282
16.	AAA	148,872
17.	Wis. Cen.	107,408
18.	Hawaiian	98,102
19.	Inland	90,555
20.	Colonial	88,651
21.	Lake Cen..	85,925
22.	Piedmont	85,107
23.	Southern	79,359
24.	Frontier	76,990
25.	Robinson	61,566
26.	Ozark	59,952
27.	SWA	46,480
28.	Pioneer	43,959
29.	TTA	29,482
30.	Empire	18,511
31.	W. Coast	10,577
32.	Central	5,994
33.	Bonanza	3,066
34.	Trans-Pac.	2,181
35.	Wiggins	1,701
36.	Caribair	.....
37.	Mid-West	.....
38.	PAA	.....
		43,964,067

Rank	Airline	Freight Ton-Miles
1.	PAA	51,480,664
2.	AA	37,194,025
3.	UAL	22,724,520
4.	TWA	22,114,064
5.	NWA	11,253,793
6.	EAL	5,685,628
7.	NAL	5,347,939
8.	Capital	5,280,033
9.	Delta	3,598,604
10.	Braniff	3,390,635
11.	C & S	1,536,190
12.	Hawaiian	831,597
13.	Western	612,501
14.	CAL	583,749
15.	MCA	552,463
16.	Frontier	303,611
17.	NEA	247,413
18.	Colonial	162,688
19.	Pioneer	162,239
20.	Inland	143,838
21.	Piedmont	126,328
22.	SWA	125,243
23.	TTA	65,055
24.	Robinson	39,082
25.	W. Coast	35,583
26.	Caribair	26,686
27.	Trans-Pac.	26,201
28.	Bonanza	16,033
29.	Central	10,928
30.	Panagra	617
31.	Lake Cen..	315
32.	AAA	.....
33.	Empire	.....
34.	Mid-West	.....
35.	Ozark	.....
36.	Southern	.....
37.	Wiggins	.....
38.	Wis. Cen..	.....
		173,678,265

[1] Mail ton-miles include air parcel post.
[2] Operations of Western and its subsidiary, Inland, should be considered as consolidated, although reports are filed separately as shown here.
[3] Figures include operations of local service segment (Route 106) awarded MCA in the Parks Air Lines Investigation Case.
[4] Carrier authorized to transport mail May 15, 1951.
NOTE: In above tabulation domestic and international operations of companies have been combined.

Source: American Aviation Survey



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Dependable CHAMPION Spark Plugs!

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Since all Champion Spark Plugs are built to one single standard of excellence in quality, value and performance, you may be certain that Champions for your car, your private airplane or boat—as well as for truck and tractor—will assure you top engine performance and dependability.

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ter ton-miles.

While the industry gain in air freight volume was 7%, the 16 domestic trunk-lines freight traffic was off 12% with only seven carriers reporting gains. National Airlines was the big gainer with a total of 5,042,306 freight ton-miles as against 2,912,976 in 1950. TWA followed with a gain of more than 1,000,000 at 14,975,152. United Air Lines' air freight dropped from 28,-034,278 in 1950 to 22,216,445 last year but it was the leader in air express showing a gain of 7% or 9,881,945 express ton-miles flown. Eastern Air Lines' 5,361,468 ton-miles of air freight was off more than 4,500,000 while its express showed a gain of almost 500,000 ton-miles to 4,876,136.

Air express ton-miles, which were up 33.8% in 1950 as compared to 1949, still were rising and with a 9% gain in 1951 moved up from 36,629,167 to 40,261,669.

Non-Skeds Carry 600,000 in Boom Year

The non-scheduled airline industry, riding the crest of a military traffic boom, outdid all previous years of their operations in 1951 with total operating revenues exceeding $61,000,000, a gain of close to $28,000,000 over 1950.

In perhaps the stormiest year of a stormy history, the non-skeds transported 592,963 passengers, according to reports filed with CAB by 54 carriers. Eleven of these had not submitted fourth quarter figures at press time and the totals must be regarded as minimums.

Cargo-wise, the non-skeds more than doubled their 1950 results carrying 34,-663 tons more than 79,000,000 ton miles.

Future of this group of carriers hinges on several possible developments. In 1951, CAB started an over-all investigation aimed at determining if there is a place for non-scheduled transportation and, if so, which carriers are entitled to perform it.

But of more immediate importance, since the investigation will cover several years, are the length of the current mobilization which has resulted in profitable military contract operations and CAB's ultimate decision on whether to further reduce gross operating weight of the Curtiss C-46 aircraft.

Last year the industry found a friend in Alabama Senator Sparkman's committee on small business which locked horns with CAB on almost every non-sked issue. With such support and with economic conditions as they are, the non-skeds will be very much in the picture in 1952.



SHIPMENTS BY AIR, which formerly were limited to small, lightweight items, are now frequently packages like this 20,000-lb. cotton gin about to be loaded aboard a PAA Cargo Clipper for shipment from Dallas, Texas, to Managua, Nicaragua.

Air Cargo Growth — 1950-1951

DOMESTIC TRUNKLINES & CERTIFICATED ALL-CARGO CARRIERS

Carrier	1951 Freight ton-miles	1951 Express ton-miles	1950 Freight ton-miles	1950 Express ton-miles
American	35,484,319	8,928,227	35,304,598	7,481,535
Braniff	1,989,402	1,037,985	1,956,236	1,064,368
Capital	5,280,033	2,558,911	8,586,983	2,288,458
C & S	864,048	763,611	893,320	730,012
Colonial	110,761	88,651	109,810	84,847
Continental	583,749	166,282	498,873	114,833
Delta	3,598,604	1,203,375	3,161,596	1,077,385
Eastern	5,361,468	4,876,136	9,751,213	4,390,971
Inland	143,838	90,555	163,574	71,976
MCA	513,366	272,209	519,972	246,372
National	5,042,306	482,097	2,912,976	605,779
Northeast	247,413	188,776	298,415	187,442
Northwest	3,691,176	1,778,094	7,115,826	2,139,416
TWA	14,975,152	7,509,904	13,804,122	6,421,636
United	22,216,445	9,881,945	28,034,278	9,215,794
Western	612,501	434,911	697,894	508,343
Sub-Total	**100,714,581**	**40,261,669**	**113,809,676**	**36,629,167**
ALL-CARGO				
Flying Tigers	29,173,038	.....	21,435,309	.....
Slick	67,890,612	.....	45,612,474	.....
U. S. Airlines	(N.A.)	.....	3,896,585	.....
Sub-Totals	**97,063,650**	.....	**70,944,368**	.....
TOTALS	**197,778,231**	**40,261,669**	**184,754,044**	**36,629,167**

N.A.—Not available

Revenues, Expenses, Traffic—Large Irregular Carriers

1950 AND 1951

Operator		Total Operating Revenue[1]	Total Operating Expenses[1]	Profit or Loss	Revenue Passengers	Revenue Passenger Miles (000)	Tons of Revenue Cargo	Revenue Cargo Ton Miles (000)
Aero Finance Corp.	**1951**	**$996,005**	**$1,005,868**	**$—9,863**	**19,227**	**24,884**	.....	.....
	1950	355,233	292,485	62,748	8,541	9,784	.....	.....
Aerovias Sud Americana	**1951**	**297,364**	**298,223**	**—959**	.....	.....	**1,024**	**1,364**
	1950	159,930	179,063	—19,133	.....	.....	1,282	786
Airline Transport Carriers	**1951**	**1,232,714**	**1,298,611**	**—65,897**	**2,620**	**4,888**	.....	.....
	1950	874,527	—740,893	133,634	2,503	1,404	.....	.....
Air Services, Inc.	**1951**	**70,226**	**81,292**	**—11,066**	**1,532**	**922**	.....	.....
	1950	65,394	60,813	4,581	3,144	2,454	.....	.....
Air Transport Associates	**1951**	**1,529,406**	**1,261,861**	**267,545**	**16,383**	**26,777**	**1,284**	**2,247**
	1950	911,418	897,286	14,132	10,385	16,937	967	1,576
All American Airways	**1951**	**616,203**	**442,883**	**173,320**	**7,851**	**10,543**	.....	.....
	1950	19,346	35,061	—15,715	520	347	2	2
American Air Export and Import Company	**1951**	**705,616**	**642,776**	**62,840**	.....	.....	**2,528**	**2,116**
	1950	992,385	865,395	—126,990	33	20	345	363
American Air Transport	**1951**	**1,036,812**	**917,228**	**119,584**	**33,259**	**36,412**	.....	.....
	1950	498,891	374,220	124,671	17,882	18,586	.....	.....
American Flyers	**1951**	**185,948**	**184,908**	**1,040**	**4,756**	**4,133**	**5**	**11**
	1950	83,531	83,439	92	2,800	1,820	20	101
Arctic Pacific, Inc.	**1951**	**326,586**	**313,956**	**12,630**	.....	.....	**668**	**1,163**
	1950	186,849	197,913	—11,064	19	31	432	718
Argonaut Airways Corp.	**1951**	**278,606**	**258,003**	**20,603**	**25,626**	**16,846**	**60**	**395**
	1950	148,483	143,255	5,228	8,887	7,884	29	26
Arnold Air Services, Inc.	**1951**	**17,766**	**15,952**	**1,814**	**159**	**218**	.....	.....
	1950	129,213	190,556	—61,343	2,071	3,020	82	128
Associated Air Transport	**1951**	**308,056**	**303,298**	**4,758**	**4,884**	**6,133**	**208**	**275**
	1950	33,079	32,086	993	125	101	55	59
Aviation Corp. of Seattle	**1951**	**384,363**	**373,368**	**10,995**	**4,788**	**10,118**	**10**	**28**
	1950	268,272	310,381	—42,109	9,985	11,902	80	75
Blatz Airlines, Inc.	**1951**	**135,974**	**134,172**	**1,802**	**3,593**	**4,146**	.....	.....
	1950	72,383	77,147	—4,764	5,770	3,086	.....	.....
Capitol Airways, Inc.	**1951**	**580,044**	**563,745**	**16,299**	**4,845**	**6,067**	**43**	**52**
	1950	335,722	325,621	10,101	1,050	1,214	148	111
Caribbean American Lines	**1951**	**2,282,078**	**2,162,945**	**119,133**	**37,282**	**55,566**	.....	.....
	1950	91,679	88,961	2,718	.....	.....	196	170
Central Air Transport	**1951**	**1,157,716**	**1,222,851**	**—65,135**	**19,189**	**29,336**	.....	.....
	1950	267,132	281,911	—14,779	4,280	6,393	.....	.....
Coastal Cargo Co., Inc.	**1951**	**556,787**	**503,139**	**53,648**	**6,538**	**8,211**	**923**	**755**
	1950	236,237	221,714	14,523	.....	.....	1,543	1,132
Conner Airlines	**1951**	**499,266**	**451,582**	**47,684**	**7,904**	**11,282**	**1,037**	**1,356**
	1950	129,943	120,981	8,962	730	1,516	495	1,984
Continental Charters	**1951**[2]	**1,170,172**	**1,122,558**	**47,614**	**29,442**	**37,818**	**399**	**363**
	1950	872,409	803,636	68,773	15,213	24,055	559	542
Economy Airways	**1951**[2]	**402,432**	**432,238**	**—29,806**	**9,231**	**19,110**	.....	.....
	1950	190,770	184,322	6,448	7,759	12,746	.....	.....
Federated Airlines, Inc.	**1951**[2]	**519,187**	**527,044**	**—7,857**	**7,038**	**13,627**	.....	.....
	1950	126,890	129,230	—2,340	4,100	5,248	.....	.....
General Airways, Inc.	**1951**	**519,210**	**451,038**	**68,172**	**1,716**	**2,776**	**472**	**704**
	1950	294,588	242,713	51,875	1,501	2,366	550	690
Great Lakes Airlines	**1951**[2]	**1,012,421**	**1,025,127**	**—12,706**	**27,473**	**47,428**	.....	
	1950	1,204,022	1,198,732	5,290	23,500	42,147	.....	.....
Hemisphere Air Transport	**1951**	**197,689**	**199,267**	**—1,578**	**2,842**	**5,404**	.....	.....
	1950	10,008	10,331	—323	278	334	.....	.....
Kesterson, Inc.	**1951**[2]	**161,104**	**157,699**	**3,405**	**5,633**	**5,280**	.....	.....
	1950	54,275	52,499	1,776	1,404	1,218	.....	.....

Panagra specifies **Janitrol**



The friendly atmosphere in Panagra's luxurious DC-6 El InterAmericano is due, in part, to Janitrol heaters. Writes Thomas Kirkland, Panagra's vice-president, operation: "Their outstanding dependability has kept inspection time and replacements to a minimum. The units average 2350 hours of aircraft flight time. As a result Panagra has specified Janitrol heaters as standard equipment on its new DC-6B's." Thanks, Panagra! This outstanding airline is one of a great many who find it good business to specify Janitrol for dependability and economy on all new aircraft . . . For help on heating problems, wherever and whenever you need it, call your Janitrol representative.

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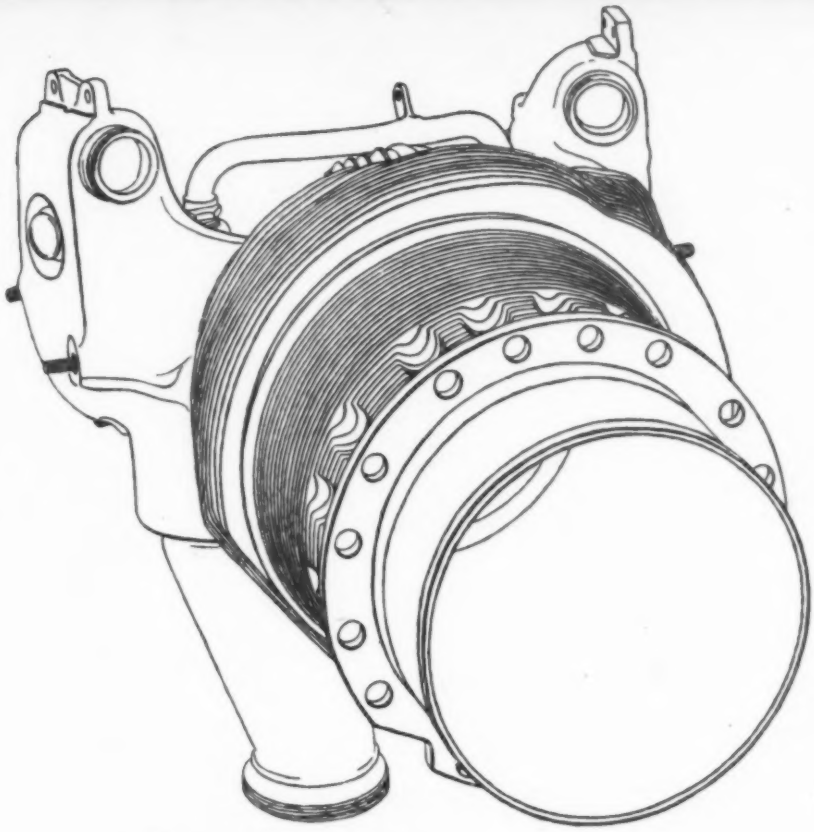
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Irregular Carriers

(*Contd. from page* 110)

		Total Operating Revenue[1]	Total Operating Expenses[1]	Profit or Loss	Revenue Passengers	Revenue Passenger Miles (000)	Tons of Revenue Cargo	Revenue Cargo Ton Miles (000)
Los Angeles Air Service	**1951**	**521,863**	**449,208**	**72,655**	**7,120**	**12,971**	.....	.....
	1950	901,932	777,985	123,947	10,043	18,779	.....	.....
Mantz Air Services, Paul	**1951**	**170,807**	**157,516**	**13,291**	**1,175**	**487**	**41**	**3**
	1950	194,210	147,845	46,365	1,120	423	15	2
Meteor Air Transport	**1951**	**382,106**	**404,051**	**21,945**	**741**	**1,291**	**3,836**	**2,013**
	1950	328,812	322,621	6,191	495	292	3,966	1,834
Miami Airlines, Inc.	**1951**[2]	**714,092**	**641,196**	**72,896**	**21,699**	**26,112**	**406**	**290**
	1950	435,076	438,313	—3,237	11,509	16,412	1,144	971
Modern Air Transport	**1951**[2]	**578,878**	**538,192**	**40,686**	**21,411**	**34,403**	.....	.....
	1950	1,257,953	1,120,341	137,612	21,895	33,173	.....	.....
Monarch Air Service	**1951**	**774,093**	**738,003**	**36,090**	**3,755**	**12,174**	**33**	**52**
	1950	1,001,833	1,001,243	590	10,065	19,395	50	28
New England Air Express	**1951**[2]	**508,093**	**464,603**	**43,490**	**13,783**	**30,182**	**81**	**115**
	1950	741,796	694,141	47,655	13,129	22,755	54	83
Overseas National Airways	**1951**	**4,716,669**	**4,371,659**	**345,010**	**9,901**	**53,588**	**2,222**	**11,361**
	1950	2,289,728	2,312,300	—22,572	3,190	12,674	813	4,798
Pearson Alaska, Inc. (World Wide Airlines)	**1951**	**143,607**	**134,328**	**9,279**	**4,141**	**4,426**	.....	.....
	1950	111,247	111,739	—492	3,348	4,081	.....	.....
Peninsular Air Transport	**1951**	**1,020,276**	**1,000,846**	**19,429**	.....	.....	.....	.....
	1950	723,188	677,838	45,350	18,570	21,687	.....	.....
Quaker City Airways, Inc.	**1951**	**60,340**	**61,599**	**—1,259**	**66**	**117**	**216**	**202**
	1950	79,578	65,510	14,068	648	626	444	367
Remmert-Werner, Inc.	**1951**	**757,162**	**595,368**	**161,794**	**13**	**6**	.....	.....
	1950	379,708	367,889	11,819	23	21	2	4
Robin Airlines (North Continent)	**1951**	**31,794**	**34,892**	**—3,098**	**449**	**936**	.....	.....
	1950	734,392	842,397	—108,005	9,915	21,250	.....	.....
S. S. W., Inc.	**1951**	**375,583**	**387,391**	**11,808**	**7,550**	**17,302**	.....	.....
	1950	30,140	27,233	2,907	837	1,465	.....	.....
Scott Aero Services (U. S. Air Coach)	**1951**	**358,353**	**379,780**	**—21,427**	**9,156**	**15,008**	.....	.....
	1950	337,032	349,943	—12,911	3,229	7,850	.....	.....
Seaboard & Western Airlines	**1951**	**11,031,740**	**9,363,370**	**1,668,370**	**11,241**	**55,536**	**5,615**	**26,833**
	1950	5,516,806	5,112,570	404,236	10,012	46,253	1,911	9,459
Southern Air Transport	**1951**	**438,622**	**379,828**	**58,794**	**5,672**	**6,487**	**1,027**	**919**
	1950	195,345	187,524	7,821	.....	.....	671	826
Standard Air Cargo	**1951**	**174,528**	**156,346**	**18,182**	**4,374**	**6,234**	**2**	**5**
	1950	184,795	148,645	36,150	2,606	3,306	8	13
Stewart, Edgar A.	**1951**	**104,366**	**88,939**	**15,427**	**3,374**	**1,799**	.....	.....
	1950	90,926	79,706	11,220	1,919	1,026	.....	.....
Trans American Airways	**1951**[2]	**488,273**	**469,888**	**18,385**	**9,156**	**14,319**	.....	.....
	1950	725,986	729,656	—3,670	15,526	22,036	.....	.....
Trans Caribbean Air Cargo	**1951**	**1,114,482**	**1,003,290**	**111,191**	**12,969**	**20,717**	**66**	**161**
	1950	681,749	667,244	—14,505	6,585	14,934	41	92
Trans National Airlines	**1951**	**62,793**	**60,963**	**1,830**	**10,206**	**13,624**	.....	.....
	1950	86,287	69,915	16,372	1,762	2,543	.....	.....
Transocean Air Lines	**1951**	**12,146,748**	**11,433,360**	**713,388**	**47,380**	**108,426**	**9,413**	**21,788**
	1950	7,733,790	7,914,814	—181,024	27,567	82,266	889	5,488
Twentieth Century Airlines	**1951**	**5,171,357**	**5,596,127**	**—424,770**	**86,608**	**150,125**	.....	.....
	1950	.....	.....	.....	.....	.....	.....	.....
Unit Export Co.	**1951**	**245,109**	**238,341**	**6,768**	**2,345**	**2,703**	**333**	**242**
	1950	50,778	67,149	—16,371	.....	.....	685	282
U. S. Overseas Airlines, Inc. (Ocean Air Tradeways)	**1951**	**2,055,832**	**2,508,821**	**—452,989**	**1,865**	**12,239**	**2,531**	**4,499**
	1950	303,778	306,274	—2,496	1,891	3,086	.....	.....
World Airways, Inc.	**1951**	**507,269**	**455,079**	**52,190**	**13,002**	**27,155**	**178**	**163**
	1950	375,301	405,419	—30,118	10,243	21,705	59	147
TOTALS	**1951**	**$61,834,586**	**$58,464,616**	**$3,369,970**	**592,963**	**1,016,292**	**34,663**	**79,475**
	1950	**34,104,775**	**33,086,898**	**1,017,877**	**318,607**	**764,829**	**17,537**	**32,857**

[1] *Generally operating Revenues or Expenses. In some cases data include total income or total expenses.*
[2] *Includes only figures reported for first 9 months, 1951. Last quarter figures not available.*



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INDUSTRIAL-AVIATION DIVISION
R. M. HOLLINGSHEAD CORPORATION, Camden 2, N. J.
LEADER IN MAINTENANCE CHEMICALS

Airline Employe Productivity

Carrier	1946			1950			1951		
	No. of Employees	Total ton-miles rev. traffic	Ton-miles per Employe	No. of Employees	Total ton-miles rev. traffic	Ton-miles per Employe	No. of Employees	Total ton-miles rev. traffic	Ton-miles per Employe
American	14,148	151,884,767	10,735	11,019	221,816,322	20,130	14,017	297,482,320	21,223
Braniff	2,441	23,027,582	9,434	2,235	25,261,614	11,302	2,410	30,483,333	12,648
Capital	4,774	36,472,866	7,639	3,474	53,530,477	15,408	4,078	68,670,412	16,002
C & S	2,045	14,856,170	7,264	1,234	13,562,028	10,990	1,385	18,416,312	13,296
Colonial	564	4,752,253	8,425	544	5,190,884	9,542	617	6,495,473	10,527
Continental	700	7,916,367	11,309	713	7,935,116	11,129	884	11,851,051	13,406
Delta	2,643	21,903,281	8,287	2,146	32,963,112	15,360	2,591	45,616,475	17,625
Eastern	6,636	88,649,810	13,358	7,487	144,874,447	19,350	8,255	175,161,239	21,218
Inland	185	2,330,378	12,595	210	3,816,093	18,171	224	4,346,432	19,403
Mid-Continent	961	8,134,065	8,464	1,080	11,117,384	10,293	1,222	13,071,178	10,696
National	1,905	18,788,378	9,862	1,937	30,197,658	15,589	2,444	48,179,174	19,713
Northeast	1,122	7,267,369	6,477	707	7,099,518	10,041	774	8,602,344	11,114
Northwest	4,274	41,181,283	9,635	4,744	61,746,439	13,015	4,882	53,580,817	10,975
TWA	10,061	85,642,067*	8,512	9,009	136,815,605	15,186	10,543	180,212,309	18,041
United	13,363	122,254,911	9,148	9,678	186,310,120	19,250	10,937	219,298,730	20,051
Western	2,342	20,546,237	8,772	1,078	20,881,377	19,370	1,194	23,202,548	19,432
Totals	**68,164**	**655,607,784**	**9,618**	**57,295**	**963,118,194**	**16,809**	**66,457**	**1,204,670,647**	**18,127**

** TWA operations suspended from Oct. 21 to Nov. 15 because of pilot strike.* *Source: American Aviation Survey*

Employe Productivity Doubles in Five Years

EXPERIENCE has shown that in new industries continuously increasing rates of productivity can be expected. Such has certainly been the case in the first 25 years of commercial air transporation. In 1951, the 16 domestic scheduled trunk airlines piled up 1,204,670,647 ton-miles of revenue traffic with a total average employment of 66,457 which breaks down to a ton-mile productivity per employe of 18,127. This compares with 16,809 ton-miles of service performed per employe in 1950 when the same carriers with 57,295 employes handled a total of 963,118,194 ton-miles of revenue traffic. In 1946 it was 9,618 ton-miles of service per employe.

The exceptional rise in employe productivity by the airline industry is illustrated by the fact that in 1951 output per employe for the trunklines as a group increased 7.8% over the preceding year and was almost double that for 1946. Total production for the trunk airlines in 1951 was up 25% with employment for the year increased by 16% despite the rise in productivity. The 7.8% increase in the airline industry productivity was substantially above the general average of American industry as it is an accepted fact that productivity in American industry as a whole rises at a rate of about 2% compounded.

24th Year

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Tulsa, Oklahoma

CHARLES W. SHORT, JR.
Manager

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The friendly feeling of home when you're 6,000 miles from home! That's the *extra* part of Braniff service that makes every passenger feel like a very important person indeed.

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Taxes Exceed Trunkline Mail Pay

EIGHT out of the 16 domestic scheduled trunk airlines paid Federal income taxes in 1951 exceeding their compensation for transportation of mail for the year. Seven of the eight companies with taxes in excess of mail pay earned a net profit before mail pay. An AMERICAN AVIATION compilation from reports filed with the Civil Aeronautics Board revealed that the trunk airlines' mail pay in 1951 amounted to $37,624,365 or only 5.6% of total operating revenues of $663,432,485 while federal income taxes took a bite of $59,913,155. Better than $48,000,000 of the total tax figure was paid in by the "Big Four": American, $17,457,500; Eastern, $13,596,677; TWA, $8,488,556; and United, $8,906,000, with less than $22,000,000 received in mail pay.

Dependence of the trunklines on mail support has steadily declined in the past ten years to the 1951 low of 5.6% of total revenues. In 1950 mail pay amounted to 8.8% of the carriers' total operating revenues whereas in 1940 it came to 26%.

1951 Mail Pay Compared to Federal Taxes

Domestic Trunk Airlines

Carrier	Total Operating Revenues	Mail Revenues	Federal Income Tax
American Airlines	$157,768,744	$ 6,680,182	$17,457,500
Braniff Airways	17,763,677	1,320,779	876,000
Capital Airlines	38,702,493	1,175,957	1,748,000
Chicago and Southern	11,826,791	1,202,976	527,000
Colonial Airlines	4,732,247	831,559	2,260
Continental Air Lines	8,120,975	1,189,352	346,302
Delta Air Lines	25,312,732	998,067	2,609,290
Eastern Air Lines	98,319,404	2,554,987	13,596,677
Inland Air Lines	3,116,679	474,767	186,387
Mid-Continent Airlines	9,818,363	1,608,590	149,000
National Airlines	26,093,024	1,087,092	2,337,123
Northeast Airlines	7,366,859	1,519,980	209,160
Northwest Airlines	32,594,207	3,988,445	1,200,000
Trans World Airlines	96,689,176	5,366,667	8,488,556
United Air Lines	112,659,627	6,887,757	8,906,000
Western Air Lines	12,547,487	737,208	1,273,900
Totals	**$663,432,485**	**$37,624,365**	**$59,913,155**

Local Service Airlines

All-American Airways	$ 3,857,936	$ 1,875,361	$ .....
Bonanza Air Lines	976,655	549,397	.....
Central Airlines	1,356,843	1,030,608	.....
Empire Air Lines	1,075,608	607,310	8,482
Frontier Airlines	4,104,653	2,508,989	.....
Lake Central Airlines	971,368	516,477	.....
Mid-West Airlines	401,056	380,904	.....
Ozark Air Lines	2,150,888	1,656,862	.....
Piedmont Airlines	3,653,417	924,632	154,387
Pioneer Air Lines	3,601,892	1,080,986	116,165
Robinson Airlines	2,265,290	1,150,294	.....
Southern Airways	2,625,507	1,626,097	.....
Southwest Airways	2,390,964	789,131	22,400
Trans-Texas Airways	2,630,692	1,652,239	28,445
West Coast Airlines	1,355,988	651,084	69,396
Wiggins Airways	344,052	314,679	.....
Wisconsin Central	2,097,607	1,181,596	.....
Totals	**$35,860,416**	**$18,877,123**	**$ 399,275**

MIDWEST TO THE SOUTH ATLANTIC

Piedmont's fast, dependable DC-3 Pacemaker flights daily interlock 32 key cities in seven states. "The Route of the Pacemakers" links scenic rises of the Appalachian Mountains with the sun-drenched Atlantic coast at popular Myrtle, Carolina, Wrightsville and Virginia Beaches.

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PIEDMONT sets the PACE in Local Service System PROGRESS

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44,379,426 passenger miles in

4,521,974 revenue ton miles in

65,808 ton miles of air mail in

1951

Last year 70% more people flew PIEDMONT'S famous DC-3 PACEMAKERS

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Winston Salem, N. C.

Airport Traffic Control and Landing Aids

CONTINENTAL U. S.

City and (Airport)	Instrument Landing System	PAR	Approach Lights	Combined Tower Station D TV AC	Tower-AC	ASR	Tower
Region One							
Albany, N. Y. (Municipal)	E-7-52	.....	E-9-52	E-7-52	5-12-43	E-7-52	.....
Allentown, Pa. (Bethlehem-Easton)	DOCAI	.....	.....	.....	10-20-50	.....	.....
Atlantic City, N. J. (NAS)	E-7-53	.....	.....	.....	.....	.....	.....
Baltimore (Friendship Intl.)	9-13-50	.....				—3	
			*4-5-51	E-9-52	6-23-50	E-11-52	.....
Baltimore (Harbor)	.....	.....	.....	.....	.....	.....	6-1-42
Bedford, Mass. (Hanscom)	8-13-48	.....	4-15-48	.....	10-3-47	.....	.....
Binghamton, Mass. (Broome County)	OWGS	.....	.....	8-15-51	.....	.....	.....
		—1	*Indef			—1	
Boston (Logan Intl.)	11-15-50	11-15-50	5-27-47	.....	1-1-42	0-28-50	.....
Bridgeport, Conn. (Municipal)	.....	.....	.....	.....	.....	.....	2-11-43
						—3	
Buffalo, N. Y. (Municipal)	5-28-47	.....	12-30-40	.....	1-7-42	E-2-54	.....
Burlington, Vt. (Municipal)	DOCAI	.....	.....	E-6-52	8-15-46	.....	.....
Charleston, W. Va. (Kanawka Co.)	OWGS	.....	5-3-49	.....	7-17-50	.....	.....
Elmira, N. Y. (Chemung County)	.....	.....	.....	.....	.....	.....	9-21-48
Erie, Pa. (Port Erie)	6-20-47	.....	11-15-46	.....	.....	.....	.....
						—3	
Harrisburg, Pa. (State)	E-7-53	.....	.....	.....	5-1-42	E-2-45	.....
Hartford, Conn. (Brainard)	.....	.....	.....	.....	3-1-42	.....	.....
Islip, N. Y. (MacArthur)	5-14-48	.....	7-2-47	.....	.....	.....	.....
Lynchburg, Va. (Preston Glenn)	.....	.....	.....	11-12-46	.....	.....	.....
		—2		—AC		—2	
Newark, N. J. (Municipal)	2-19-47	indef.	*3-24-50	.....	H-42	Indef.	.....
			ALPA				
			2-29-51				
New Bedford, Mass. (Municipal)	8-30-49	.....	3-2-49	.....	.....	.....	E-11-52
		—1				—1	
New York (LaGuardia)	6-21-46	5-31-50	*E-7-52	.....	10-1-46	5-31-50	.....
		—1				—1	
New York (International)	6-4-49	2-15-51	*11-9-49	.....	6-1-48	2-15-51	.....
Niagara Falls, N. Y. (Municipal)	5-18-49	.....	.....	.....	.....	.....	11-13-47
						—2	
Norfolk, Va. (Municipal)	5-21-48	.....	1-2-48	3-5-52	.....	E-8-52	.....
		—2				—2	
Philadelphia (Intl.)	6-11-47	E-11-52	*11-16-51	.....	4-1-47	E-8-52	.....
Pittsburgh (Allegheny County)	11-20-49	.....	1-18-49	.....	11-1-42	.....	.....
			1-15-38				
		—2				—2	
Pittsburgh (Greater Pitts.)	Indef.	E-8-53	4-11-49	.....	.....	E-8-52	E-7-52
Portland, Me. (Municipal)	.....	.....	.....	E-6-52	.....	.....	12-17-48
						—3	
Providence, R. I. (T. F. Greene)	E-5-53	.....	.....	.....	2-1-42	E-2-54	.....
Reading, Pa. (Gen. Carl A. Spatz)	6-30-47	.....	10-2-46	.....	10-15-47	.....	.....
Richmond, Va. (Byrd)	9-9-48	.....	12-13-47	.....	1-7-43	.....	.....
Roanoke, Va. (Municipal)	.....	.....	.....	E-5-52	3-1-43	.....	.....
Rochester, N. Y. (Municipal)	E-11-52	.....	.....	E-7-52	12-1-48	.....	.....
Syracuse, N. Y. (Hancock)	9-20-49	.....	10-4-49	E-7-52	9-1-46	.....	.....
		MPN-1				MPN-1	
Teterboro, N. J. (Teterboro)	6-15-49	E-4-52	5-20-48	.....	.....	E-4-52	8-25-47
		—1				—1	
Washington (National)	10-23-45	1-10-51	*5-30-50	.....	6-15-41	1-10-51	.....
Westfield, Mass. (Barnes)	.....	.....	.....	.....	.....	.....	12-11-47
Wheeling, W. Va. (Ohio County)	E-7-52	.....	.....	.....	.....	.....	E-11-52
White Plains, N. Y. (Westchester Co.)	4-9-48	.....	11-19-47	.....	1-1-47	.....	.....
Wilkes-Barre, Pa. (Scranton)	6-8-51	.....	.....	.....	.....	.....	E-9-53
Wilmington, Del. (New Castle Co.)	6-28-51	.....	2-7-49	.....	10-30-47	.....	.....
Windsor Locks, Conn. (Bradley)	9-18-47	.....	9-8-47	.....	9-15-48	.....	.....
Worcester, Mass. (Municipal)	1-10-49	.....	3-10-48	.....	.....	.....	.....
Region Two							
Ashville, N. C. (Hendersonville)	.....	.....	.....	.....	.....	.....	8-15-50
		—1				—1	
Atlanta, Ga. (Municipal)	11-24-29	10-15-50	*1-20-51	.....	11-1-41	10-15-50	.....
Augusta, Ga. (Bush)	E-7-52	.....	.....	7-1-50	.....	.....	.....

NOTE: See Page 124 for explanation of symbols.

(Continued on page 120)



Recognize this glamorous news-film star?

It's a giant Boeing Stratocruiser—one of the Speedbird fleet operated over the Atlantic by British Overseas Airways Corporation.

Although flying the oceans is a day-in, day-out routine for these staunch Boeing skyliners, their passenger lists frequently glitter with the names of celebrities, of VIP's—even of royalty. Then BOAC's London departures take on all the excitement of a theatrical première. And it is then you'll find plane and passengers co-starring in take-off productions like the one pictured above.

The tremendous "box-office" appeal of the big Boeing is so exceptional that BOAC Stratocruisers recently broke all previous records—attaining 96% load-capacity for an entire month's operations. BOAC's ten Stratocruisers have completed 2376 Atlantic crossings in the past two years—carrying a total of 94,311 passengers.

There are many reasons why travelers ask for the double-deck Stratocruiser by name. They like the wide, luxuriously soft seats, each with plenty of stretch-out leg room. They like full-sized berths; and low-altitude cabin comfort, with sky-pure air, changed draftlessly every 90 seconds. They like to stroll down spacious aisles, and to relax with congenial company in the Stratocruiser's unique lower-deck lounge.

But, perhaps most important of all, they appreciate the smooth, quiet ride, and the steady dependability of these Boeing-built airplanes.

Fleets of Boeing-built Stratocruisers are in service on **Pan American World Airways, Northwest Airlines, United Air Lines, British Overseas Airways Corporation.** For the Air Force Boeing builds the TB-50 Superfortress, B-47 Stratojet, C-97 Stratofreighter; and is now under way on the B-52 Stratofortress.

BOEING
STRATOCRUISER

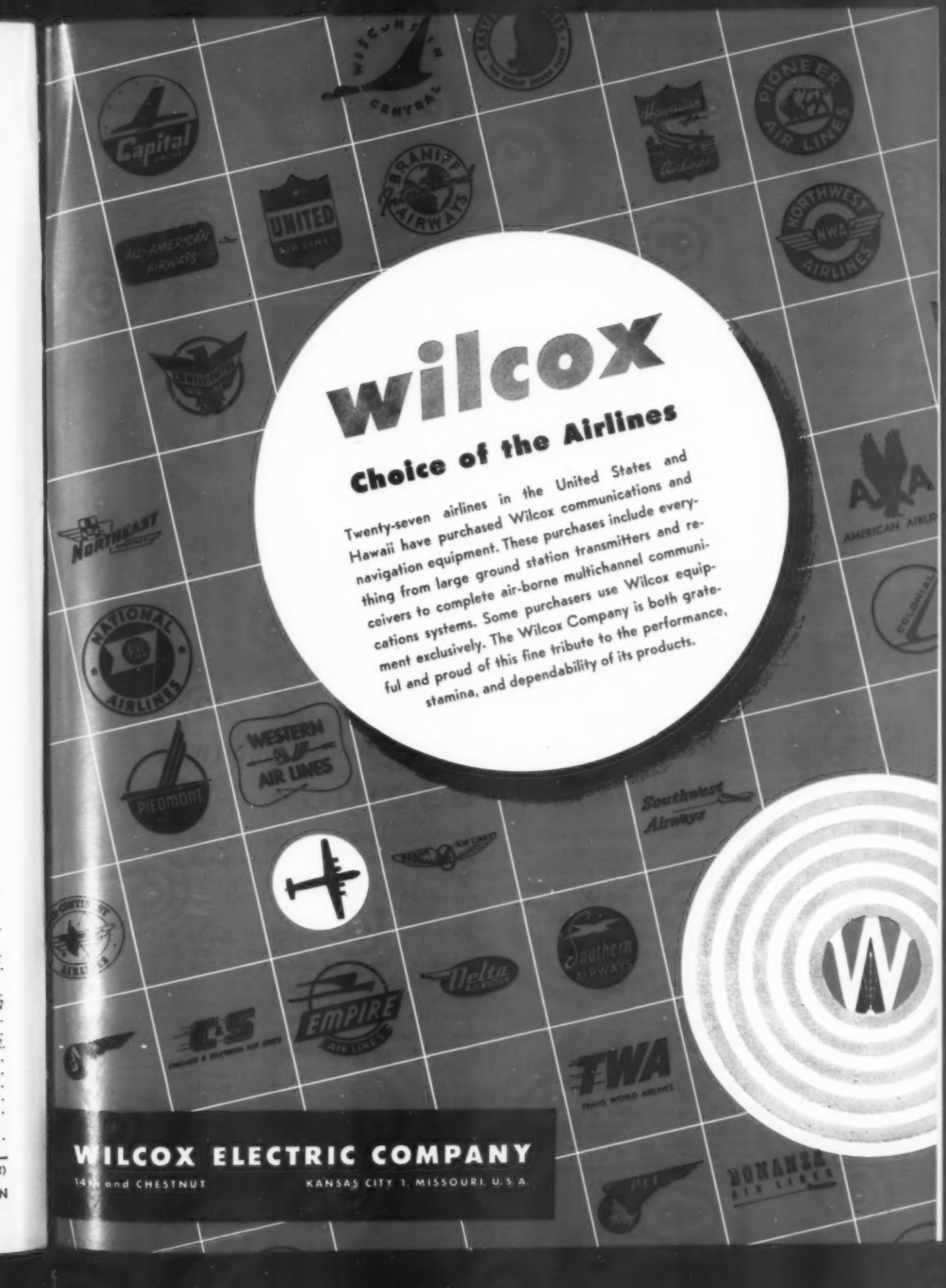
Airport Landing Aids

(*Continued from page 118*)

	Instrument Landing System	Par	Approach Lights	Combined Tower Station D TV AC	Tower-AC	ASR	Tower
Birmingham, Ala. (Municipal)	2-16-48	.....	*4-30-51	.....	1-1-42	—2 E-11-52	.....
Bristol, Tenn. (Tri-City)	12-17-49	.....	1-14-49	E-1-53	10-5-46	.....	.....
Charleston, S. C. (Municipal)	12-18-46	.....	9-18-46	E-6-52	4-9-42	.....	.....
Charlotte, N. C. (Douglas)	8-10-49	.....	7-16-48	.....	11-15-41	—3 E-2-54	.....
Chattanooga, Tenn. (Lovell)	E-7-52	.....	E-9-52	1-9-52	.....	.....	.....
Columbia, S. C. (Municipal)	E-7-52	.....	.....	6-13-51	.....	.....	.....
Columbus, O. (Muscogee Co.)	DOCAI	.....	.....	.....	.....	.....	.....
Daytona Beach, Fla. (Municipal)	.....	.....	.....	E-6-52	9-11-47	.....	.....
Greensboro, N. C. (High Point)	E-7-52	.....	E-9-52	.....	7-28-43	.....	.....
Greenville, S. C. (Municipal)	E-5-53	.....	.....	.....	7-15-48	.....	.....
Jackson, Miss. (Hawkins)	3-20-47	.....	1-10-47	12-6-51	.....	.....	.....
Jacksonville, Fla. (Imeson)	3-13-47	.....	1-1-47	.....	1-1-42	—2 E-8-52	.....
Knoxville, Tenn. (McGhee Tyson)	11-22-46	.....	*E-8-52 10-23-46	.....	5-21-42	—3 E-11-53	.....
Macon, Ga. (Cochran)	E-7-52	.....	.....	.....	.....	.....	.....
Memphis, Tenn. (Municipal)	11-26-46	.....	11-23-46	.....	1-1-42	—2 E-11-52	.....
Meridan, Miss. (Keg)	3-31-49	.....	12-1-48	.....	.....	.....	.....
Miami, Fla. (International)	1-18-52	.....	12-29-51	.....	8-3-42	.....	.....
Mobile, Ala. (Bates)	E-7-52	.....	.....	.....	2-18-47	.....	.....
Montgomery, Ala. (Donnelly)	DOCAI	.....	.....	.....	4-14-48	—3 E-11-53	.....
Nashville, Tenn. (Berry)	10-15-48	.....	*4-18-51	.....	1-1-42	—3 E-8-53	.....
Orlando, Fla. (Municipal No. 1)	E-7-52	.....	.....	.....	11-27-41	.....	.....
Pensacola, Fla. (Haglar)	E-6-53	.....	.....	.....	5-7-49	.....	.....
Raleigh, N. C. (Raleigh-Durham)	11-22-46	.....	10-25-46	.....	1-20-47	.....	.....
San Juan, P. R. (Isla Grande)	.....	.....	.....	.....	11-1-47	.....	.....
Savannah, Ga. (Travis)	E-7-52	.....	.....	E-9-52	10-1-50	.....	.....
Spartanburg, S. C. (Municipal)	.....	.....	.....	3-17-52	.....	.....	.....
Tallahassee, Fla. (Dale Mabry)	9-3-47	.....	9-3-47	E-9-52	3-18-42	.....	.....
Tampa, Fla. (International)	2-3-48	.....	10-23-47	E-9-52	6-10-46	.....	.....
W. Palm Beach, Fla. (International)	.....	.....	.....	E-11-52	4-25-42	.....	.....
Wilmington, N. C. (New Hanover Co.)	E-6-53	.....	.....	9-12-51	.....	.....	.....
Winston-Salem, N. C. (Smith Reynolds)	E-7-52	.....	.....	.....	11-16-42	.....	.....
Region Three							
Akron, O. (Municipal)	.....	.....	....	E-8-52	.....	.....	11-25-42
Akron (Akron Canton)	7-1-48	.....	7-2-48	.....	12-30-48	.....	.....
Battle Creek, Mich. (Kellogg)	.....	.....	.....	.....	3-21-49	.....	.....
Bismark, N. D. (Municipal)	12-9-47	.....	12-22-47	.....	.....	.....	.....
Chicago (Midway)	4-30-47	—1 5-15-42	*3-4-50 8-7-42	.....	7-1-43	—1 9-21-50	.....
Chicago (Ohare)	11-4-47	.....	.....	.....	10-23-46	.....	.....
Cincinnati, O. (Greater Cincinnati)	1-10-47	.....	1-10-47	.....	1-10-47	—2 E-11-52	.....
Cincinnati (Lunken)	.....	.....	.....	.....	10-16-42	.....	.....
Cleveland (Municipal)	3-28-48	—1 9-5-50	*9-25-50 3-28-48	.....	2-1-43	—1 9-5-50	.....
Columbus, O. (Port Columbus)	1-7-49	.....	1-7-49	.....	2-12-42	—2 E-11-52	.....
Dayton, O. (Municipal)	7-31-46	.....	11-28-46	.....	3-26-43	—3 E-11-53	.....
Decatur, Ill. (Municipal)	.....	.....	.....	.....	.....	.....	Indef.
Detroit (Willow Run)	7-31-47	—2 E-8-53	*1-19-51	.....	.....	—2 E-8-52	.....
Detroit (Wayne Major)	E-5-53	.....	.....	.....	1-31-47	.....	8-30-47
Detroit (Detroit City)	.....	.....	.....	.....	8-1-46	.....	.....
Duluth, Minn. (Municipal)	.....	.....	.....	4-16-51	.....	.....	.....
E. St. Louis, Ill. (Parks)	.....	.....	.....	.....	.....	.....	Indef.
Evansville, Ind. (Dress Mem.)	E-7-52	.....	.....	E-10-52	11-4-42	.....	.....
Fargo, N. D. (Municipal)	4-1-49	.....	12-29-47	.....	8-6-46	.....	.....
Flint, Mich. (Bishop)	E-7-52	.....	.....	.....	10-1-46	.....	.....
Fort Wayne, Ind. (Baer)	3-12-49	.....	E-6-52	E-9-52	4-21-47	.....	.....
Grand Rapids, Mich. (Kent County)	E-7-53	.....	.....	.....	9-15-47	.....	.....
Indianapolis (Municipal)	6-15-46	—2 E-11-53	*5-2-51 12-4-46	.....	11-18-43	—2 E-11-52	.....

NOTE: See Page 124 for explanation of symbols.

(*Continued on page 122*)


Capital
UNITED
BRANIFF AIRWAYS
PIONEER AIR LINES
NORTHWEST AIRLINES
ALL-AMERICAN AIRWAYS
NORTHEAST
NATIONAL AIRLINES
WESTERN AIR LINES
PIEDMONT
Southwest Airways
Southern AIRWAYS
Delta
EMPIRE AIR LINES
TWA
TRANS WORLD AIRLINES
BONANZA AIR LINES
COLONIAL
AMERICAN AIRLIN
wilcox
Choice of the Airlines
Twenty-seven airlines in the United States and Hawaii have purchased Wilcox communications and navigation equipment. These purchases include everything from large ground station transmitters and receivers to complete air-borne multichannel communications systems. Some purchasers use Wilcox equipment exclusively. The Wilcox Company is both grateful and proud of this fine tribute to the performance, stamina, and dependability of its products.
WILCOX ELECTRIC COMPANY
14th and CHESTNUT
KANSAS CITY 1, MISSOURI, U.S.A.

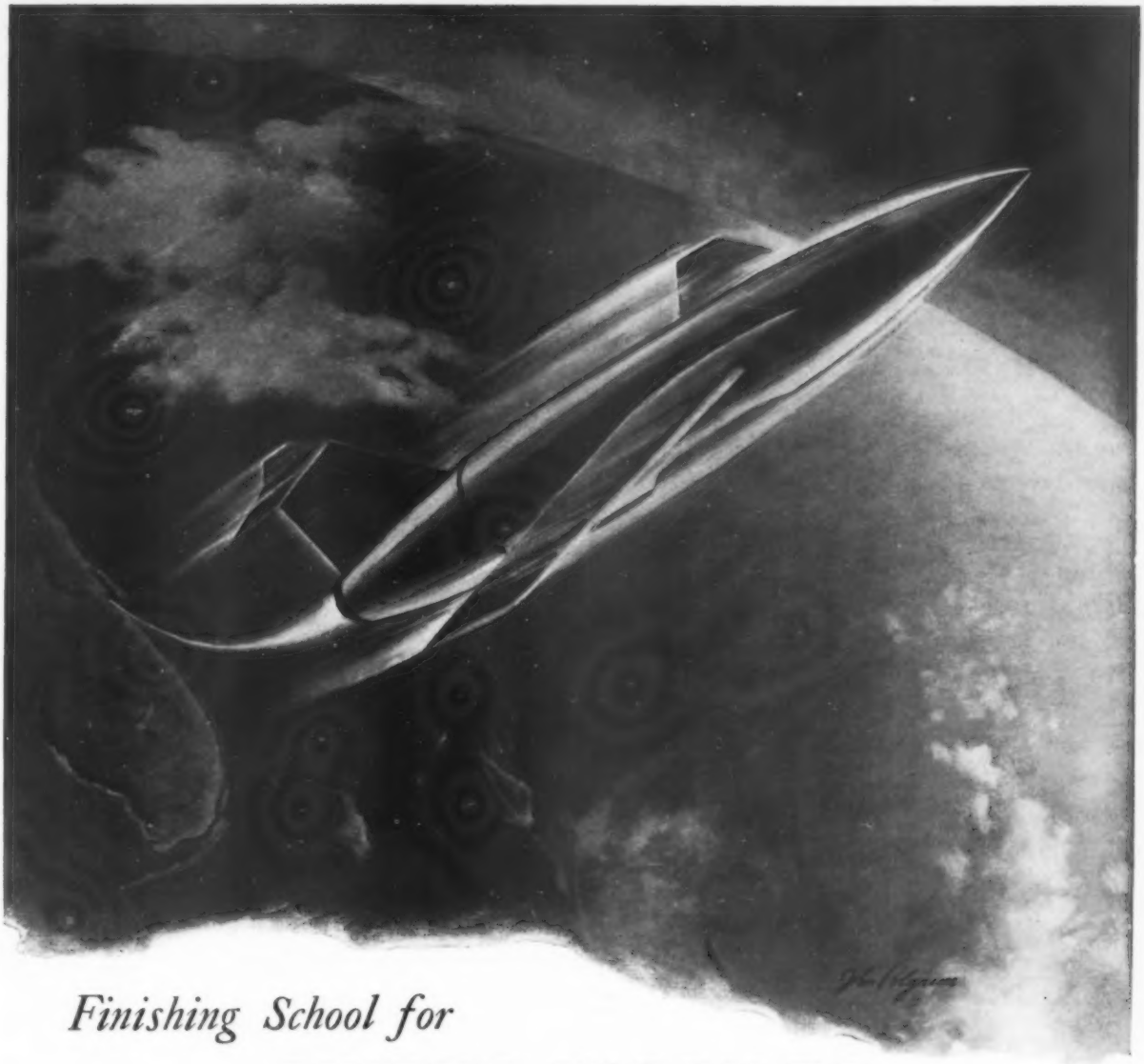
Airport Landing Aids

(*Continued from page 120*)

	ILS	PAR	Approach Lights	Combined Tower-Station D TV AC	Tower A-C	ASR	TOWER
Lansing, Mich. (Capital City)	E-6-53				4-30-49		
Lexington, Ky. (Blue Grass)					1-15-50		
Louisville, Ky. (Standiford)	11-15-47		*4-27-51		11-15-47	—3 E-11-53	
Louisville, Ky. (Bowman)							10-1-48
Madison, Wis. (Municipal)	E-7-52				5-1-49		
Milwaukee (Gen. Mitchell)	2-25-49		2-25-49		6-3-42	—3 E-2-54	
Minneapolis (St. Paul Intl.)	3-6-51		*3-6-51 4-29-48		5-16-42	—2on E-11-52 MPN-1 7-16-51	
Moline, Ill. (Quad City)	4-4-50		4-11-50				E-2-53
Muskegon, Mich. (County)	E-6-53				6-16-49		
Peoria, Ill. (Greater Peoria)				12-15-50 —AC			
Rochester, Minn. (Municipal)				E-8-52	10-1-46		
St. Paul, Minn. (Holman)							
Sault Ste. Marie, Mich. (Kinross)	4-25-50						
South Bend, Ind. (St. Joseph Co.)	5-3-48		6-21-48		9-16-43		
Springfield, Ill. (Capital)							E-9-52
Toledo (Municipal)					2-16-46		
Youngstown, O. (Municipal)	E-7-52				5-1-47		
Region Four							
Abilene, Tex. (Municipal)	E-6-53			8-7-51			
Albuquerque, N. M. (Kirkland AFB)	1-11-47		9-14-43		11-18-41		
Amarillo, Tex. (Air Terminal)	4-25-51		4-25-51		10-2-42		
Austin, Tex. (Robert Mueller)	7-26-47		7-26-47		7-5-43		
Baton Rouge, La. (Harding)	E-7-52						
Beaumont, Tex. (Jefferson Co.)	E-5-53						
Brownsville, Tex. (International)	11-30-46		9-12-46	12-15-50			
Corpus Christi, Tex. (Cliff Mans)	E-5-53			E-8-52	10-1-42	—3 E-2-54	
Dallas, Tex. (Love)	2-3-47	—2 E-8-53	*E-7-52		5-16-42	—2 E-11-52	
El Paso, Tex. (International)	3-4-47		10-1-46		10-1-42		
Fort Smith, Ark. (Municipal)	E-7-52						
Fort Worth, Tex. (Intl.)	E-6-52		*E-6-52			—3 E-2-54	E-8-52
Fort Worth (Meacham)	12-23-46		12-11-43		6-11-42		
Houston (Municipal)	6-13-47	—2 E-2-54	*1-1-51		6-12-42	—2 E-8-52	
Lake Charles, La. (AFB)	E-7-53						
Little Rock, Ark. (Adams)	E-6-53			10-15-51			
Lubbock, Tex. (Municipal)	E-7-52				10-15-49		
Midland, Tex. (Air Terminal)	1-7-49		9-17-48	E-7-52			
Monroe, La. (Selman)	E-7-52						
New Orleans (Municipal)				E-6-52 no AC	5-1-46		9-22-47
New Orleans (Moisant Intl.)	5-15-47		4-4-51			—2 E-11-52	
Oklahoma City (Will Rogers)	6-19-47		*E-7-52		2-1-46	—2 E-2-53	
San Angelo, Tex. (Mathis)							E-8-52
San Antonio (Municipal)	1-7-47		9-12-46		—3 E-2-54		
San Antonio (Stinson)				11-20-42			9-1-49
Shreveport, La. (Municipal)	E-6-52		E-7-52	E-6-52	1-15-43	—3 E-8-53	
Tulsa, Okla. (Municipal)	1-21-47		10-1-46	E-6-52	2-26-42	—3 E-2-54	
Waco, Tex. (Municipal)				5-28-51			
Wichita Falls, Tex. (Sheppard AFB)	Indef.				4-22-48		
Region Five							
Casper, Wyo. (Natroona County)	E-7-52						
Cheyenne, Wyo. (Municipal)	7-26-47		3-18-47		7-30-42		
Colorado Springs (Peterson)	3-23-51			8-1-48			
Denver, Colo. (Stapleton)	7-11-46		*E-9-52 4-5-46		2-1-42	—2 E-8-53	
Des Moines (Municipal)	11-5-47		8-19-47		9-13-43		
Grand Junction, Colo. (Walker)	2-20-46		6-8-46				
Heron, S. D. (Municipal)	E-8-52						
Joplin, Mo. (Municipal)	E-7-52						

NOTE: See Page 124 for explanation of symbols.

(*Continued on page 124*)



Finishing School for

GUIDED MISSILES

The Air Force Missile Test Center, used by all our military services as a long-range proving ground, stretches thousands of miles from Florida, out over the Bahamas, into the South Atlantic.

A pilotless bomber roars away from its launching stand, picks up speed, zooms into the blue. Setting its course for a far-off target in the ocean, it rockets over a chain of tiny islands where men and machines check its flight, its behavior, the operation of its guidance and control systems. It's a vital part of our air power of the future—aeronautical research and development laying the foundation for continued U. S. air supremacy!

Operated by the USAF's Air Research and Development Command, the Missile Test Center is geared up to test the wide variety of missiles, rockets and pilotless aircraft vital to modern air power. It reached its full stature with the recent completion of down-range observation stations. And the dramatic B-61 pilotless bomber, the Matador, designed and produced by Martin as part of its diversified missiles program, was the first to use the completed range. THE GLENN L. MARTIN COMPANY, Baltimore 3, Maryland.

Martin AIRCRAFT

Builders of Dependable Aircraft Since 1909

Illustration is artist's conception of Air Force B-61 Matador pilotless bomber.

DEVELOPERS AND MANUFACTURERS OF: Navy P5M-1 Marlin seaplanes • Air Force B-57A Canberra night intruder bombers • Air Force B-61 Matador pilotless bombers • Navy P4M-1 Mercator patrol planes • Navy KDM-1 Plover target drones • Navy Viking high-altitude research rockets • Air Force XB-51 developmental tactical bomber • Martin airliners • Guided missiles • Electronic fire control & radar systems • **LEADERS IN** Building Air Power to Guard the Peace, Air Transport to Serve It.

Airport Landing Aids

(Continued from page 22)

	ILS	PAR	Approach Lights	Combined Tower-Station D TV AC	Tower-AC	ASR	Tower
Kansas City, Kans. (Fairfax)	.....	.....	.....	.....	.....	.....	3-16-42
Kansas City, Mo. (Municipal)	5-16-47	—2 E-11-53	*E-5-52 1-22-48	.....	1-1-42	—2 E-2-53	.....
Lincoln, Neb. (Municipal)	E-7-52	.....	.....	3-6-51 no AC	.....	.....	.....
Omaha, Neb. (Municipal)	9-24-50	.....	12-31-49	.....	7-23-42	.....	.....
Pueblo, Colo. (Municipal)	DOACI	.....	.....	E-9-52	.....	.....	3-15-50
Quincy, Ill. (Municipal)	E-8-52	.....	.....	.....	.....	.....	.....
Rock Springs, Wyo. (Municipal)	10-11-47	.....	9-2-47	.....	.....	.....	.....
St. Joseph, Mo. (Rosecrans)	1-15-48	.....	12-23-47	E-9-52 no AC	.....	.....	12-27-46
St. Louis (Lambert)	6-25-47	—2 E-11-53	*3-29-51	.....	1-1-42	—2 E-2-53	.....
Sioux City, Iowa (Municipal)	E-8-52	.....	.....	.....	3-5-45	.....	.....
Sioux Falls, S. D. (Municipal)	E-7-52	.....	.....	CTS E-8-52	.....	.....	.....
Springfield, Mo. (Municipal)	.....	.....	.....	.....	.....	.....	E-9-52
Topeka, Kans. (Philip Billard)	12-1-48	.....	11-4-50	4-10-51	.....	.....	.....
Wichita, Kans. (Municipal)	4-11-47	.....	2-5-46	.....	1-1-42	.....	.....
Region Six							
Arcata, Calif. (Municipal)	4-21-51	.....	*7-1-50	.....	.....	.....	.....
Bakersfield, Calif. (Kern County)	4-18-47	.....	.....	.....	.....	.....	5-27-42
Burbank, Calif. (Lockheed AT)	E-7-52	.....	*E-6-52	E-9-52	2-16-43	—3 E-11-53	.....
Fresno, Calif. (Air Terminal)	6-14-49	.....	7-13-48	E-5-52	.....	.....	2-20-48
Las Vegas, Nev. (McCarran)	.....	.....	.....	6-8-51 no AC	.....	.....	.....
Long Beach, Calif. (Municipal)	3-11-48	.....	10-1-47	.....	1-16-42	—3 E-11-53	.....
Los Angeles, Calif. (Intl.)	6-25-47	—1 6-15-50	*1-18-50	.....	1-22-42	—1 6-15-50	.....
Oakland, Calif. (Municipal)	3-6-47	—2 E-11-53	*3-8-51	.....	3-10-42	—2 E-11-52	.....
Ontario, Calif. (Intl.)	3-13-52	.....	9-28-50	.....	.....	.....	.....
Phoenix, Arizona (Sky Harbor)	.....	.....	.....	.....	6-1-42	.....	.....
Reno, Nev. (United Air Lines)	.....	.....	.....	8-2-51 no AC	.....	.....	.....
Sacramento, Calif. (Municipal)	8-18-51	.....	.....	E-5-52	1-11-43	.....	.....
Salt Lake City, U. (Municipal No. 1)	12-6-46	.....	10-16-46	.....	11-6-41	—2 E-2-53	.....
San Diego, Calif. (Montgomery)	Indef.	.....	.....	.....	.....	.....	.....
San Diego, Calif. (Lindberg)	.....	.....	.....	.....	4-1-42	.....	.....
San Francisco (Municipal)	2-27-48	—2 E-2-54	*Indef.	.....	6-1-42	—2 E-11-52	.....
Santa Barbara, Calif. (Municipal)	OWGS	.....	.....	.....	11-1-42	.....	.....
Santa Monica, (Municipal)	.....	.....	.....	.....	.....	.....	10-1-48
Stockton, Calif. (Stockton)	.....	.....	.....	.....	.....	.....	Indef.
Tucson, Arizona (Municipal)	.....	.....	.....	.....	.....	.....	5-1-42
Van Nuys, Calif. (San Fernando V.)	.....	.....	.....	.....	.....	.....	4-1-51
Winslow, Arizona (Municipal)	.....	.....	9-1-47	.....	.....	.....	.....
Region Seven							
Bellingham, Wash. (Municipal)	E-8-52	.....	.....	.....	.....	.....	.....
Billings, Mont. (Municipal)	10-26-46	.....	10-21-46	.....	9-29-42	.....	.....
Boise, Idaho (Air Terminal)	1-23-48	.....	1-23-48	E-8-52	2-23-42	.....	.....
Eugene, Ore. (Mahlon Sweet)	12-20-46	.....	12-20-46	.....	.....	.....	.....
Everett, Wash. (Paine)	Indef.	.....	.....	.....	.....	.....	.....
Great Falls, Mont. (Municipal)	E-7-52	.....	.....	.....	7-22-42	.....	.....
Helena, Mont. (Municipal)	.....	.....	.....	7-16-51 no AC	.....	.....	.....
Medford, Ore. (Municipal)	E-5-53	.....	.....	E-1-53	1-24-42	.....	.....
Pendleton, Ore. (Municipal)	E-9-52	.....	.....	.....	2-23-42	.....	.....
Pocatello, Idaho (Phillips)	E-4-53	.....	.....	E-5-52 no AC	.....	.....	6-1-49
Portland, Ore. (Intl.)	10-13-51	—2 E-11-53	*E-7-52	.....	11-24-41	—2 E-2-53	.....
Salem, Ore. (McNary)	E-5-52	.....	.....	.....	.....	.....	4-14-49
Seattle, Wash. (Seattle Tacoma)	3-16-47	—2 E-11-53	*11-16-51	.....	7-7-49	—2 E-11-52	.....
Seattle, Wash. (Boeing)	.....	.....	.....	.....	.....	.....	1-1-42
Spokane, Wash. (Geiger)	2-23-48	.....	2-23-48	.....	1-1-42	.....	.....
Yakima, Wash. (Municipal)	E-5-53	.....	.....	E-8-52 no AC	.....	.....	1-8-43

E—Estimated
OWGS—Operating without Glide Slope
—2—General Electric
No AC—No approach control

DOACI—Dependent on completion of airport improvements.
—1—Gilfillan Brothers
—3—Bendix Aviation
**—Hi-intensity approach lights*

Source: Civil Aeronautics Administration

Non-Carrier Aircraft Use in 1951

	Number
Agricultural	
By farmers, ranchers, etc. in connection with operation of farm, ranch, etc.	7,481
By commercial operators in seeding, dusting, spraying, fertilizing, etc.	4,234
Industrial	
Aerial photography or surveying, power or pipeline patrol, medical or ambulance service, prospecting for oil, minerals, etc.	1,101
Advertising, including banner and sign towing	486
Instructional	11,919
Transportation for Hire	
Passenger or cargo, including charter, contract, irregular, jitney, etc.	3,376
Business	
In connection with a business or profession	18,244
Federal, State, and Local Governments	1,066
Pleasure and Sport	10,801
U. S. Aircraft out of U. S.	836
Total Non-Carrier Aircraft, Active	59,544

Source: American Aviation Survey

Defense Slows Non-Carrier Production

Output of 2,500 is only 200 more than in 1950; Beech, Piper, and Cessna produce lion's share.

BECAUSE of the continued concentration on military production, civil light aircraft production for 1951 reached 2,500 units, representing an increase of only 200 over 1950's 2,300. The industry estimates that without defense restrictions output could have been doubled.

According to the CAA, of the total 59,544 non-carrier aircraft registered, 18,244 or about 31% are engaged in business or professional activity. Agriculture absorbs the second largest number, with 19% of the total number of aircraft being put to work in connection with operation of farms or ranches and/or by commercial operators utilizing lightplanes for seeding, dusting, etc.

Voluntary Policing

Because of the limited number of new aircraft coming off the assembly line, the industry has voluntarily been policing distribution to divert the production to essential defense purposes and to increase agricultural output.

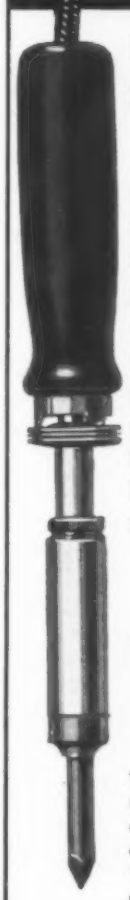
Beech Aircraft Corp., Piper Aircraft Co., and Cessna Aircraft Co., the "Big Three" of the executive field, combined to produce all but 400 of the 1951 total. Beech led the way in dollar volume, having delivered 400 planes in exchange for nearly $9,000,000. Piper came out as the largest unit producer, with over 1,200 two- and four-place planes valued at about $4,000,000 coming out of the plant. Cessna received about $4,000,000 for 500 aircraft.

During the fiscal year running from October, 1950, through September 30, 1951, Beech turned out 396 four-place Bonanzas, now selling at $15,990, as compared to 405 during the previous comparable period. Total production on this model begun in 1947 had passed the 3,000 mark by the end of 1951. Deliveries of the Beechcraft Model 18 twin-engine executive transport more than doubled, however, with 58 being delivered during the 1951 fiscal period as opposed to 22 in 1950's. Since V-J Day 625 Model 18's have been completed.

Beech's greatest activity was with the six-place Model 50 Twin Bonanza. Not certificated until May 25, a year's production of this aircraft had already been sold out by the month before. With material shortages permitting, Beech hopes to turn out at least 100 of these new executive transports by the end of 1952.

Piper found civilian production to be somewhat higher than 1950's, with a 38% increase in dollar volume recorded. Approximately 70% of the company's activity was devoted to civilian versions of the Super Cub and Pacer series.

American Beauty



ELECTRIC SOLDERING IRONS

are sturdily built for the hard usage of industrial service. Have plug type tips and are constructed on the unit system with each vital part, such as heating element, easily removable and replaceable. In 5 sizes, from 50 watts to 550 watts.

TEMPERATURE REGULATING STAND

This is a thermostatically controlled device for the regulation of the temperature of an electric soldering iron. When placed on and connected to this stand, iron may be maintained at working temperature or through adjustment on bottom of stand at low or warm temperatures.



For further information or descriptive literature, write

AMERICAN ELECTRICAL HEATER COMPANY
DETROIT 2, MICH., U. S. A.

Worldwide Directory of Airlines

NORTH AMERICA

United States

All-American Airways, Inc., Washington National Airport, Hangar No. 12, Washington 1, D. C.
Equipment: 12 DC-3's
Total Employees: 548

American Airlines, Inc., Executive, Sales, Treasury and Personnel Offices: 100 Park Ave., New York 17, N. Y. Operations and Engineering Offices: New York Airport Station, Flushing 71, N. Y.
Equipment: 13 DC-4 Airfreighters; 1 DC-4; 49 DC-6's; 17 DC-6B's; 78 Convairs
Total Employees: 14,639

Bonanza Air Lines, Inc., Box 391, Las Vegas, Nev.
Equipment: DC-3's

Braniff Airways, Inc., Love Field, Dallas 19, Texas
Equipment: 13 DC-3's; 9 DC-4's; 9 DC-6's
Total Employees: 2,820
Pilots Employed: 246

Capital Airlines, Inc. (Formerly Pennsylvania-Central Airlines Corp.), Washington National Airport, Washington 1, D. C.
Equipment: 24 DC-3's; 24 DC-4's; 1 C-47 (cargo); 1 C-54's (cargo-liners); 5 Constellations; 3 Super DC-3's
Total Employees: 4,136
Pilots Employed: 480

Caribbean-Atlantic Airlines, Inc., P. O. Box 3214, San Juan, Puerto Rico
Equipment: 3 DC-3's

Catalina Air Transport, Catalina Airport, Avalon, Calif.

Central Airlines, Inc., 6109 Camp Bowie Blvd., Ft. Worth 7, Texas
Equipment: 3 C-46's; 7 DC-3's; 1 Beech A-35

Chicago and Southern Air Lines, Inc., General Offices: Memphis Municipal Airport, Memphis 2, Tenn.
Equipment: 12 DC-3's; 6 Constellations L-649A's
Total Employees: 1,470
Pilots Employed: 157

Colonial Airlines, Inc., Executive Offices: 230 Park Ave., New York 17, N. Y.
Equipment: 8 DC-3's; 4 DC-4's
Total Employees: 652
Pilots Employed: 82

Continental Air Lines, Inc., Stapleton Airfield, Denver 7, Colo.
Equipment: 10 DC-3's; 5 Convairs
Total Employees: 880
Pilots Employed: 114

Delta Air Lines, Inc., Atlanta Municipal Airport, Atlanta, Georgia
Equipment: 7 DC-6's; 6 DC-4's; 17 DC-3's; 3 C-47's (cargo)
Total Employees: 2,591
Pilots Employed: 264

Eastern Air Lines, Inc., Eastern Air Lines Bldg., 10 Rockefeller Plaza, New York 20, N. Y.
Equipment: 14 Super Constellation L-1049's; 20 Constellation L-749's; 14 DC-4's; 47 DC-3's; 2 C-47's
On Order: 60 Martin 4-0-4's; 16 Super Constellation L-1049C's
Total Employees: 8,750
Pilots Employed: 538; Chief Pilots: 5; Check Pilots, 28; Captains: 334
Flight Engineers: 156

Empire Air Lines, Inc., Gowen Field, Box 268, Boise, Idaho
Equipment: 5 DC-3's
Total Employees: 103

The Flying Tiger Line, Inc., Lockheed Air Terminal, Burbank, Calif.
Equipment: 12 C-54's; 26 C-46's
Total Employees: 1,731
Total Pilots: 300

Frontier Airlines, Inc. (Formerly Arizona Airways, Challenger Airlines and Monarch Air Lines), Stapleton Airfield, Denver 7, Colo.
Equipment: 12 DC-3C's

Hawaiian Airlines Limited, Inter-Island Bldg., P. O. Box 3287, Honolulu 1, T. H.
Equipment: 11 DC-3's; 2 DC-3's (cargo)
Total Employees: 450
Pilots Employed: 58

Helicopter Air Service, Inc., 5036 W. 63rd St., Chicago 38, Ill.
Equipment: 6 Bell helicopters

Inland Air Lines, Inc., P. O. Box 10,005, Airport Sta., 6060 Avion Drive, Los Angeles 45, Calif.
(Subsidiary of Western Air Lines, Inc.)

Island Air Ferries, Inc., MacArthur Airport, Bohemia, L. I., N. Y.
Equipment: 2 Grumman Goose; Norseman
On Order: Percival Prince
Total Employees: 8
Pilots Employed: 3
(Certificated services not yet inaugurated)

Lake Central Airlines, Inc., Weir Cook Municipal Airport, Indianapolis 44, Ind.
Equipment: 8 DC-3's; 1 Beech A-35
Total Employees: 177
Pilots Employed: 41

Los Angeles Airways, Inc., 5901 W. Imperial Highway, Box 10155, Airport Sta., Los Angeles 45, Calif.
Equipment: 3 Sikorsky S-51's
On Order: 2 Sikorsky S-55's

Metropolitan Air Commuting, Inc., Pawling, N. Y.; Rm. 4626, 30 Rockefeller Plaza, New York 20, N. Y.
(Certificated services not yet inaugurated)

Mid-Continent Airlines, Inc., General Offices: Waltower Bldg., 102 E. 9th St., Kansas City 6, Mo.; Maintenance, Communications and Purchasing Depts.: Wold-Chamberlain Int'l Airport, Minneapolis, Minn.
Equipment: 23 DC-3's; 4 Convair 240's
Total Employees: 1,239
Pilots Employed: 148

Mid-West Airlines, Inc., Municipal Airport, Omaha 2, Neb.
Equipment: 6 Cessna 190's

National Airlines, Inc., Aviation Bldg., 3240 N. W. 27th Ave., Miami 42, Fla.
Equipment: 11 Lockheed Lodestars; 6 DC-4's; 8 DC-6's
Total Employees: 2,422

Northeast Airlines, Inc., Logan Int'l Airport, 239 Prescott St., E. Boston 28, Mass.
Equipment: 4 Convairs; 7 DC-3's
Total Employees: 764
Pilots Employed: 107

Northwest Airlines Inc., 1885 University Ave., St. Paul 1, Minn.
Equipment: 10 B-377's; 22 DC-4's; 1 C-54; 7 DC-3's; 11 Martin 2-0-2's
Total Employees: 5,549
Pilots Employed: 360

Ozark Air Lines, Inc., Box 6, Lambert Field, St. Louis 21, Mo.
Equipment: 9 DC-3's

Pan American World Airways, Inc., 135 East 42nd St., New York 17, N. Y.

Atlantic Division: 28-19 Bridge Plaza North, Long Island City 1, N. Y.
Equipment: 18 Constellations; 17 Boeing Stratocruisers; 9 DC-4's; 3 DC-3's
Pilots Employed: Captains: 125; Co-pilots: 301

Latin American Division: Miami Int'l Airport, Miami, Fla.
Equipment: 21 DC-4's; 14 CV-240's; 8 DC-3's; 8 C-46's; 4 B-377's; 8 L-49's
Pilots Employed: Captains: 229; Co-pilots: 300

Pacific-Alaska Division: Int'l Airport, S. San Francisco, Calif.
Equipment: 12 Boeing Stratocruisers; 11 DC-4's
Pilots Employed: Captains: 101; Co-pilots: 211

Pan American-Grace Airways, Inc., 135 East 42nd St., New York 17, N. Y.
Total Employees: 1,557

Piedmont Airlines, Smith Reynolds Airport, Winston-Salem, N. C.
Equipment: 12 DC-3's
Total Employees: 541
Pilots Employed: 77

Pioneer Air Lines, Inc., Love Field, Dallas, Texas
Equipment: 11 DC3's
Total Employees: 448
Pilots Employed: 71

Resort Airlines, Inc., P. O. Box 242, Int'l Airport Branch, Miami 48, Fla.

Riddle Aviation Co., Int'l Airport, Miami, Fla. (Mail: P. O. Box 4632, Coral Gables, Fla.)
Equipment: 5 C-46's
(Air cargo service between New York, Miami & Puerto Rico)

Robinson Airlines Corp., Ithaca East Hill Airport, Ithaca, N. Y.
Equipment: 9 DC-3's

Slick Airways, Inc., 3000 N. Clybourn Ave., Burbank, Calif.
Equipment: 21 C-46's; 3 DC-6A's

Southern Airways, Inc., General Offices: Municipal Airport, Birmingham, Ala., Traffic, Sales and Operations Office: Municipal Airport, Atlanta, Ga.
Equipment: 10 DC-3's
Total Employees: 430
Pilots Employed: 65

Southwest Airways Co., San Francisco Airport, So. San Francisco, Calif., Mail: P. O. Box 268, So. San Franciso, Calif.
Equipment: DC-3's
Total Employees: 306
Pilots Employed: 52

(Continued on page 128)


LOOK FOR THE MARKINGS THAT MEAN
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The red-white-and-blue on the propeller tips of United Mainliners are colors United wears proudly. They stand for the comradeship and team spirit that comes from 26 years of working together and of pioneering the great advances in aviation. They symbolize a standard of service that is United Air Lines.
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Airline Directory

Trans World Airlines, Inc., 10 Richards Rd., Kansas City 6, Mo.
Equipment: 42 DC-3's (passenger); 9 DC-3's (cargo); 7 DC-4's (passenger); 7 DC-4 (cargo) (2 leased); 30 Lockheed 049's; 12 Lockheed 749's; 24 Lockheed 749-A's; 12 Martin 2-0-2-A's (leased); 8 Martin 4-0-4's
Total Employees: 13,461
Pilots Employed: 900

Trans-Pacific Airlines, Ltd. (The Aloha Airline), P. O. Box 2113, Honolulu, T. H.
Equipment: 5 DC-3's

Trans-Texas Airways, Municipal Airport, Houston 17, Texas
Equipment: 10 DC-3's
Total Employees: 372
Pilots Employed: 52

United Air Lines, Inc., Executive Offices: 5959 S. Cicero Ave., Clearing Sta., Chicago 38, Ill.; Operating Base: Stapleton Field, Denver, Colo.
Equipment: 52 DC-3's; 3 DC-3A's; 11 DC-4's; 12 DC-4's (cargo); 43 DC-7's; 7 DC-6B's; 6 B-377's
Total Employees: 11,540

U. S. Airlines, Inc., Suite 714, 500 Fifth Ave., New York 36, N. Y.
Equipment: 6 C-46's

Uraba, Medellin & Central Airways, Inc., 135 E. 42nd St., New York, N. Y.

West Coast Airlines, Inc., Boeing Field, Seattle 8, Wash.
Equipment: 6 DC-3's
Total Employees: 158
Pilots Employed: 26

Western Air Lines, Inc., 6060 Avion Dr., P. O. Box 10,005, Airport Sta., Los Angeles 45, Calif.
Equipment: 10 DC-3's; 5 DC-4's; 10 Convair-Liners
Total Employees: 1,259

E. W. Wiggins Airways, Inc., Boston Metropolitan Airport, Norwood, Mass.
Equipment: 6 Cessna T-50's
Total Employees: 75

Wisconsin Central Airlines Inc., Municipal Airport, Madison, Wis.
Equipment: 6 DC-3's
Total Employees: 289

Alaska

Alaska Airlines, Inc., P. O. Box 2200, Anchorage, Alaska
Equipment: DC-4's; DC-3's; C-46's; single-engine ski & float equipment. Total: 50 planes

Alaska Coastal Airlines, P. O. Box 2808, Juneau, Alaska
Equipment: 2 Lockheed Vegas; 1 Bellanca; 1 Curtiss Kingbird; 5 Grumman G-21A's; 1 Republic Seabee; 1 Catalina

Alaska Helicopters, Inc., P. O. Box 1023, Anchorage, Alaska
Equipment: 3 Helicopter 47-D-1's
Total Employees: 5
(Charter only)

Alaska Island Airlines, Inc., P. O. Box 534, Petersburg, Alaska
Equipment: 2 Grumman Widgeons; 2 Wacos; 1 Travelair; 2 Aeroncas

Bristol Bay Airlines, Dillingham, Alaska
Equipment: 2 Stinson Station Wagons; 2 Bellanca Sky Rockets

Byers Airways, Box 1410, Fairbanks, Alaska

Equipment: 1 Twin Cessna; 1 AT-19 Stinson; 1 SR-JR Stinson; 1 Stinson 150 on floats

Christensen Air Service, Anchorage, Alaska

Equipment: 1 Waco Aristocrat; 1 J4F2 Grumman Widgeon; 1 UC-64A Noordyn "Norseman"

Cordova Air Service, Inc., P. O. Box 118, Cordova, Alaska

Equipment: 2 Gull Wing Stinsons; 1 Norseman; 3 Lycoming Cessna T-50's, 2 Piper PA-14's

Ellis Air Lines, Box 1059, Ketchikan, Alaska

Equipment: 3 Aeronca Sedans (seaplanes); 6 Grummans (amphibians)

Munz Airways, P. O. Box 639, Nome, Alaska

Equipment: 3 Stinsons; 2 Howards

Northern Consolidated Airlines, Inc., 414 Fourth Ave., Anchorage, Alaska

Equipment: 4 DC-3's, 1 C-46; 1 PBY-5A; 5 Norsemen; 10 Cessna T-50's; 5 Stinson Reliants; 1 Lockheed Vega; 2 Aeronca; 1 Seabee

Pacific Northern Airlines, Inc., Anchorage, Alaska (Mail: 1626 Exchange Bldg., Seattle 4, Wash.)

Equipment: DC-3's; DC-4's

Reeve Aleutian Airways, Inc., 420 D. St., Box 559, Anchorage, Alaska

Equipment: 3 DC-3's; 2 Sikorsky S-43's; 1 Grumman Goose; 2 Fairchild 71's; 1 Boeing 80-A

Total Employees: 44
Pilots Employed: 11

(Scheduled passenger & cargo service serving the Alaska Peninsula, The Aleutians & Pribilof Islands

Safeway Airways, Merrill Field, Anchorage, Alaska

Equipment: Grumman Widgeon; 3 Stinson Station Wagons; Piper Pacer; Piper Cub (ski, wheel & float installations)

Wien Alaska Airlines, Inc., Box 649, Fairbanks, Alaska

Equipment: 2 DC-3's; 1 S-46A; 4 Noordyn's; 3 Cessna 195's; 8 Cessna 170's

Total Employees: 52
Pilots Employed: 16

Canada

Canadian Pacific Airlines, Limited, Head Office: Vancouver, A.M.F., B. C.

Equipment: DC-3's; Canso A's; DC-4 (Interim aircraft until delivery of DH Comets and DC-6B's in Fall of 1952)

On Order: DH Comet Jet Transport
Total Employees: 1,123
Pilots Employed: 127

Central Northern Airways Ltd., Head Office: Stevenson Airport, Winnipeg

Equipment: 10 Norsemen; 4 Ansons; 1 Bellanca; 2 Cessnas; 2 Stinsons; 1 Seabee; 1 Cornell; 1 Lockheed; 2 Wacos

Leavens Bros. Air Services Ltd., Head Office: Barker Airport, Toronto, Ont.

Equipment: 31 single-engine aircraft; 5 twin-engine aircraft

Maritime Central Airways, Ltd., Charlottetown, P. E. Island

Equipment: 3 Lockheed 10's; 2 Anson Mark V's; 1 Canso; 1 C-46E; 1 DH Rapide; 6 DC-3C's; 1 Norseman IV

(*Continued on page* 130)



NEW **BENDIX AMSPEAKER**

Relieves Fatigue . . .
of Constant Listening Watch!

For the first time in the industry, Bendix* Radio is offering a simple, compact combination loud-speaker, amplifier and power supply. The combination design makes it possible to enjoy quickly the comfort, convenience and relaxation of cockpit speaker operation without involved installation problems. Just mount one near each crew member, connect 115 volts AC with audio and muting control from the crew-member's jackbox and the Amspeaker is ready for operation. Write for further details.

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Canadian Distributor: Radio Engineering Products, Ltd., 4305 Iberville Street, Montreal, Quebec.

Airline Directory

Mont Laurier Aviation Co., Ltd., Saint Jean de Brebeuf, Roberval Co., P. Q.
Equipment: 1 DH Fox Moth; 3 Norsemen; 1 PBY5A (Canso)
(Scheduled & charter cargo & passenger service)

Northern Airways Ltd., Carcross, Yukon Territory

Quebec Airways Limited, Montreal, Quebec

Queen Charlotte Airlines, Ltd., Vancouver, A.M.F., B. C.
Equipment: 2 Stranraer Flying Boats; 1 Canso Amphibian; 7 Avro-Ansons; 12 Norsemen (floats); 2 Stinsons; 1 Fairchild Husky (floats)
Total Employees: 170

Rimouski Airlines, Ltd., Rimouski, P. Q.
(Scheduled and charter service)

Saskatchewan Government Airways, P. O. Box 850. Prince Albert, Sask.
Equipment: 1 Canso; 3 Ansons; 5 Norsemen; 3 Beavers; 3 Stinsons; 4 Tiger Moths
Total Employees: 60
(Non-scheduled passenger & cargo service)

Trans-Canada Air Lines, Executive Offices: International Aviation Bldg., 1080 University St., Montreal, P. Q.
Total Employees: 5,300
Pilots Employed: 163 Captains; 174 First Officers

Wheeler Air Lines Ltd., St. Jovite, Quebec
Equipment: 1 Anson Mk-V; 3 Norsemen; 1 Waco

a few Trans-Texas Brags

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Trans-Texas, in its four years of operation, has flown approximately *10,950,000* plane miles without flying outside the state of Texas.

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R. EARL McKAUGHAN—President

TRANS-TEXAS Airways

EUROPE

Azores

Sociedade Acorena de Transportes (SATA), Rue dos Mercadores 7, ponta Delgada, Sao Miguel.
Equipment: 2 DH-104 Doves

Belgium

Sobelair (Societe Belge de Transports Par Air, S. A.), 137 Rue Royale, Brussels
Equipment: 5 DC-3's
Total Employees: 72
Pilots Employed: 12
(Non-scheduled passenger and cargo service)

Societe Anonyme Belge D'Exploitation de la Navigation Aerienne (SABENA), 145 Rue Royale, Brussels.
Equipment: 6 Convair Liners; 5 DC-6's; 9 DC-4's; 23 DC-3's and C-47's; 1 DH Dove; 8 Lockheeds; 3 JU-52's; 2 Bell 47-D1 Helicopters.
On Order: 8 DC-6B's

Bulgaria

Bulgarian-Soviet Joint Stock Co. for Civil Aviation (TABSO), 12 Place Narodno, Sabranie, Sofia.

Cyprus

Cyprus Airways, Ltd., 18 Homer Ave., Nicosia.
Equipment: 6 C-47's
Total Employees: 191

Czechoslovakia

Ceskoslovenske Aerolinie (Czechoslovakian Air Lines), 1 Namesti Republiky, Prague

Denmark

Det Danske Luftfartselskab A/S (DDL) (Danish Air Lines), Kobenhavns Lufthavn, Kastrup
Pilots Employed: 15

Finland

Aero O/Y (Finnish Air Lines), Mannerheimintie 9B, Helsinki
Equipment: DC-3's

Veljekset Karhumaki, Kuorevesi
(Operating some scheduled services in Finland with D. H. Rapides and Lockheed Lodestars)

France

Compagnie Air Transport (C. A. T.), 5, Avenue Hoche, Paris (8e)
Equipment: 5 Bristol Wayfarers

Compagnie de Transports Aeriens Intercontinentaux (TAI), 23 rue de la Paix, Paris 2e
Equipment: 7 DC-4's
(Scheduled passenger and freight service)

Compagnie Nationale Air France, 2 rue Marbeuf, Paris VIIIeme
Equipment: 19 L-749's and L-749A's; 28 DC-4's and C-54's; 31 Languedocs; 33 DC-3's; 13 JU-52's
On Order: 4 L-749A's
Total Employees: 13,000

Societe Aigle Azur, 70, avenue des Champs-Elysees, Paris
Equipment: 2 DC-4's; 5 Boeing 307; 12 DC-3's

Societe de Transports Aeriens "Alpes-Provence" (S.T.A.A.P.), 10 Rue Fortia, Marseille
Equipment: 6 Liberators; 2 DC-3's

(*Continued on page* 132)



THEY know it's a wonderful feeling to step out of a plane after a swift, comfortable trip to find their "own" automobile waiting for them, have their bags put into the trunk, and drive off without delay . . . or to go downtown and get settled in their hotel, freshen up, and then have their "own" car delivered to the door—clean, full of gas, and ready to take them wherever they want for as long as they want.

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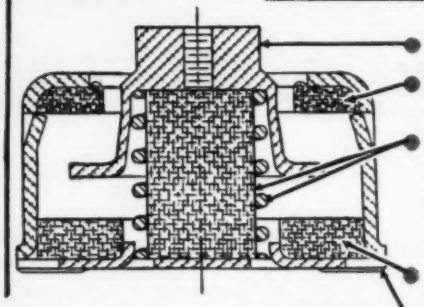
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Wide mounting surface for firm, secure attachment.

Smooth snubbing and shock protection through gradual negative load engagement by knitted monel wire buffer.

Excellent isolation efficiency; high damping and stability; non-linearity and wide load tolerance provided by the exclusive Robinson resilient element. This consists of a MET-L-FLEX cushion of knitted stainless steel wire combined with a load sharing precision formed stainless steel spring.

Overload and resilient shock protection provided by auxiliary monel MET-L-FLEX limiter.

"Proof-tested" all metal construction combines minimum weight, maximum strength and wide environmental tolerance.

All shock mounts are not alike! Most mounts provide the *minimum* acceptable performance detailed in the specification. Robinson mounts give *maximum* performance — exceed specification requirements by wide margins. Built-in "Plus" features provide the maximum of equipment protection under all service and combat conditions.



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"SEA LEVEL PERFORMANCE AT ANY ALTITUDE"

Airline Directory

Societe Transatlantiqua Aerienne, 4, rue Chauchat, Paris 9e

Equipment: 5 DC-3's

Total Employees: 70

(Scheduled and non-scheduled passenger and freight services to England and French Possessions in Africa and Asia)

Union Aeromaritime de Transport (UAT), 3, boulevard Malesherbes, Paris

Equipment: 6 DC-4's; 3 Liberators

Gibraltar

Gibraltar Airways Ltd. (GIBAIR), Cloister Building, Box 212, Irish Town

Equipment: 3 DH Rapides

Total Employees: 12

Pilots Employed: 2

Great Britain

Airwork Ltd., 15 Chesterfield St., London, W. I.

Aquila Airways, Ltd., 6 Curzon Pl., Park Lane, London, W. I.

Equipment: 12 Short Sunderland S.25's

(Scheduled and non-scheduled passenger and cargo service)

British European Airways, Head Office: Keyline House, Northolt, Middlesex London Office: Dorland House, Lower Regent St., S.W.I.

Equipment: 45 Vickers Vikings; 24 Dakotas; 20 Ambassadors; 6 Dakotas (Cargo); 20 HD 89 Rapides; 4 Helicopters

On Order: 25 Viscounts

British Overseas Airways Corp. (BOAC), Airways House, Great West Road, Brentford, Middlesex

Equipment: 22 Argonauts; 10 Stratocruisers; 10 Constellations; 25 Hermes; 10 York Freighters

On Order: 20 Comets; 16 Bristol 175's

Cambrian Air Services, Ltd., Pengam Moors Airport, Cardiff, Glam., So. Wales

(Daily Services: Cardiff-Liverpool, Channel Islands, Weston-super-Mare. Connections to Dublin, Belfast, Isle of Man & Dinard, using DH Rapide equipment)

Lancashire Aircraft Corp., Ltd., 11 Berkeley St., London, W. I.

Equipment: 23 Yorks; 5 Haltons; 13 Rapides; 5 Consuls; 11 Proctors; 5 Austers; 1 Aerovan

Total Employees: 500

(Passenger and Freight Charter)

Morton Air Services, Ltd., Croydon Airport, Surrey; Whitchurch Airport, Bristol

Equipment: 3 Doves; 4 Consuls; 3 Rapides

(Passenger, ambulance, freight charter and schedule services)

Olley Air Service Ltd., Main Hall, Croydon Airport, Croydon, Surrey

Equipment: 3 DH Doves; 4 DH Rapides; 2 Airspeed Consuls; 2 Proctors

Total Employees: 50

(Scheduled and non-scheduled passenger and cargo service)

Scottish Airlines, Prestwick Airport, Ayrshire, Scotland

(Scheduled passenger and charter services)

Silver City Airways, Ltd., 11 Great Cumberland Pl., London, W. I.

Equipment: Bristol Freighters; Consuls; Doves; Skymaster; Wayfarer

Skyways Ltd., Dunsfold Aerodrome, Nr. Godalming, Surrey

Equipment: Skymasters; Yorks; Lancastrians; Lockheed 12A's; Doves; Rapides; Dakotas

Greece

National Greek Airlines TAE (Technical and Aeronautical Exploitations Co., Ltd.) 12 Merlin St., Athens

Note: National Greek Airlines TAE is the successor of TAE, AME and HELLAS)

Hungary

Magyar-Szovjet Legiforgalmi Tarsasag (MASZOVLET), 7 Dorottya, Utca, Budapest

Iceland

Flugfelag Islands, H. F. (Iceland Airways, Ltd.), Laekjargata 4, Reykjavik

Equipment: 3 DC-3's; 1 DC-4; 3 PBY5's; 1 Grumman JRF-5; 1 DH 89A Rapide; 1 Norduyn Norseman

Total Employees: 85

Pilots Employed: 12

Loftleidir The Icelandic Airlines, P. O. Box 476, Laekjargata 2, Reykjavik

Equipment: 1 Avro Anson Mark V; 1 DC-4; 3 Grumman Goose 21a's; 1 UC-64; 1 Stinson Reliant; 2 C-47's; 2 PBY-5's

Ireland

Aer Lingus TTA (ALT), 43 Upper O'Connell St., Dublin

Equipment: 14 DC-3's; 1 Consul

Aer Rianta TTA, 43 Upper O'Connell St., Dublin

Italy

Aerolinee Italiane Internazionali (ALITALIA), via Leonida Bissolati, 20 Rome

Equipment: 4 DC-4's

On Order: 4 DC-6B's

Total Employees: 335

Pilots Employed: 78

(Scheduled passenger and Cargo service)

Linee Aeree Italiane S.P.A., (L.A.I.), Via del Tritone, 132, Rome

Equipment: 16 C-47's; 3 DC-6's

Total Employees: 530

Netherlands

Koninklijke Luchtvaart Maatschappij N. V. (K.L.M. Royal Dutch Airlines), Badhuisweg 260, P. O. Box 121, The Hague

Equipment: 13 C-47-A's; 6 C-54's; 4 DC-4's; 7 DC-6's; 18 Lockheed L-749's; 12 CV-240's

Total Employees: 11,826

Pilots Employed: 354

Norway

Braathens South-American and Far East Airtransport A/S (S.A.F.E.), H. Heyerdahlsgt. 1, Oslo

Equipment: 2 DC-4's; 1 DC-3

Total Employees: 218

Pilots Employed: 15

Det Norske Luftfartselskap A/S (DNL) (Norwegian Air Lines), Fornebu Airport, Oslo

Poland

Polskie Linie Lotnicze "LOT" (Polish Airlines "LOT"), Lot Building, rue Hoza 39, Warsaw

Equipment: 11-12; DC-3; Li-2

Portugal

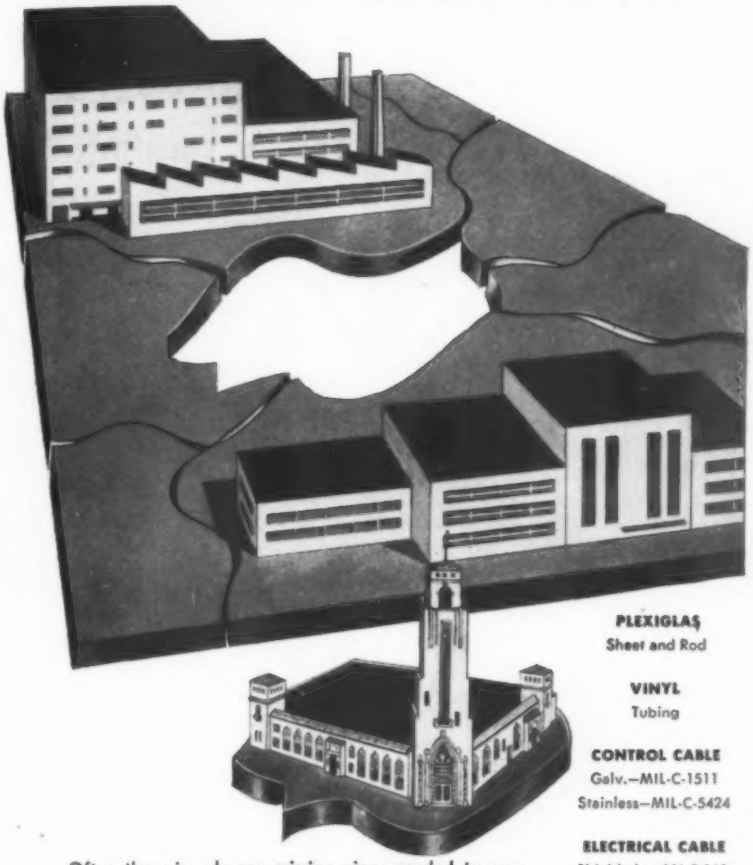
Aero Portuguesa, Lda. (AP), Avenida da Liberdade, 120, Lisbon

Transportes Aereos Portugueses (TAP), 2, Rue Braamcamp, Lisbon

Equipment: 3 DC-4's; 6 DC-3's; 1 Beechcraft

(Continued on page 135)

.... YOUR DISTRIBUTOR COMPLETES THE PICTURE



Often there is only one missing piece needed to complete the perfect relationship between you and your manufacturers. AMC SUPPLY, as your distributor for aircraft parts and supplies, does not replace your contact with the manufacturer, but supplements this relationship by keeping frequently needed stocks on hand and by keeping the manufacturer in constant touch with your operation.

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Airline Directory

Romania

Transporturi Aeriene Romana Sovietica (TARS), 11 Strada Nicolas Lorga, Bucharest

Spain

Aviacion y Comercio S.A., 333 Calle Aduana, Madrid

Equipment: Bristol Freighters; Lockheed Lodestars

Iberia (Lineas Aereas Espanolas), Plaza de Canovas del Castillo 4, Madrid

Sweden

Aktiebolaget Aerotransport (ABA) (Swedish Air Lines), Bromma Airport, Stockholm 40

Ab Nordisk Aerotjanst (NORDAERO), Kungsangens Flygplats, Norrkoping

(Non-scheduled passenger and cargo service, flying school and overhaul)

Scandinavian Airlines System, Denmark, Norway and Sweden, Head Office: Bromma Airport, Stockholm 40

Equipment: 12 DC-6's; 9 DC-4's; 6 SAAB Scandias; 25 DC-3's; 2 Sandringhams; 2 Junkers 52's

On Order: 8 DC-6B's

Total Employees: 6,600

Svensk Flygtjanst A. B. (Swedish Air Service Ltd.), Arsenalsgatan 4, Stockholm

Equipment: 1 Bucker Jungmann; 11 Saab 17's; 11 Fairey Fireflies

Switzerland

"Aerotaxi" Lufttaxi A. G., Ramistrasse 56, Zurich

Equipment: 2 Geminies

Swissair (Swiss Air Transport Co., Ltd.), Hirschengraben 84, P. O. Box 929, Zurich

Unions of Soviet Socialist Republics

Civil Air Fleet Administration (Aeroflot), Moscow

Sino-Soviet Aviation Corporation (Hamiata)

Yugoslavia

Jugoslovenski Aerotransport (JAT), Bircaninova 11111, Belgrade

Equipment: 17 DC-3's; 3 C-47's

Total Employees: 600

LATIN AMERICA

Argentina

Aerolineas Argentinas, Paseo Colon 185, Buenos Aires

Equipment: 6 DC-6's; 4 DC-4's; 5 Convairs; 6 Sandringham (flying boats)

Total Employees: 4,317

Pilots Employed: 162

Compania de Aviacion Pan American Argentina, Av. Pte, Roque Saenz, Pena 788, Buenos Aires

(Not an operating company)

Lineas Aereas del Estado (LADE), Corrientes 480, Buenos Aires

Equipment: DC-3's and Vickers-Vikings

Bahama Islands

Bahamas Airways, Ltd. (BAL), Eastbourne House, East St., Nassau

Equipment: 2 DC-3C's; 1 Catalina; 3 Goose; 1 Widgeon

(*Continued on page 136*)



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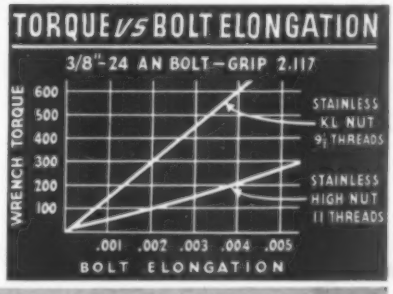
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The nut spins freely on the bolt down to the work. After the proper torque has been applied, the washer compresses causing the threaded section inside the washer to move in and lock radially and axially on the bolt. When the threaded section inside the washer picks up all the load it can carry, it elongates a few thousandths of an inch permitting the bulk of the load to move up into the main body of the nut. This reduces the high stress concentration and torsional load normally found in the first three threads in the nut and bolt, permitting more wrench torque to be applied before exceeding the elasticity in the bolt.

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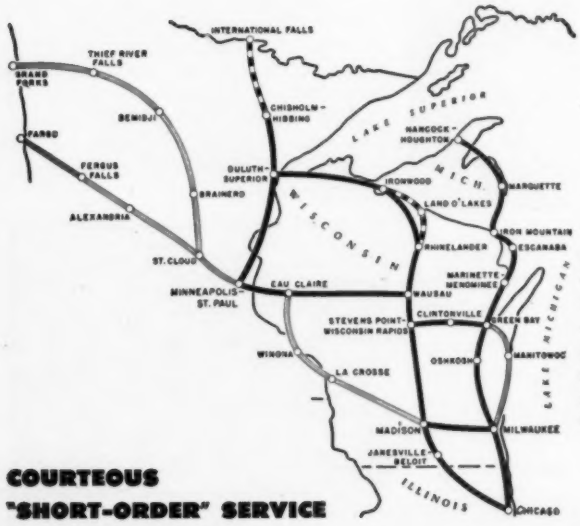
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Airline Directory

Bolivia

Lloyd Aereo Boliviano S. A. (LAB), Casilla 132, Cochabamba
Equipment: 7 DC-3A's; 3 C-47's; 3 B-17's

Brazil

Aero Geral Ltda. (AEROGERAL), 194 Ave. Franklin Roosevelt, Rio de Janeiro
Equipment: 4 PBY's; 2 C-46's

Central Aerea Ltda., Avenida General Justo 275, Anexo 13, 7° and., Rio de Janeiro

Companhia Itau de Transportes Aereos, Rua Asdrubal do Nascimento 436, Sao Paulo
Equipment: 9 C-46's
Total Employees: 385
Pilots Employed: 28

Empresa de Transportes Aereos Catarinense S. A., (T.A.C.) Florianopolis, Santa Catarina

Empresa de transportes Aereos Norte do Brasil Ltda (AERONORTE), Avenida Pedro 11, 258-D, Sao Luiz, Maranhao

Empresa de Transportes Aerovias Brasil, S. A. (Brazilian International Air lines), Av. Ipiranga, 1238, Sao Paulo
Equipment: 21 DC-3's; 3 DC-4's; 5 C-46's
Total Employees: 1,450
Pilots Employed: 150

Linhas Aereas Paulistas, S. A. (LAP), 11 Rua Mexico, Rio de Janeiro
Equipment: 4 DC-3's

Loide Aereo Nacional S/A (LOIDE), Rua Mexico 11-C, Rio de Janeiro

Navegacao Aerea Brasileira (N.A.B.), Estacao de Passageiros, sobrelja Aeroports Santos-Dumont, Rio de Janeiro

Panair do Brasil, S. A., Edificio Panair, Aeroporto Santos-Dumont, Caixa Postal 694, Rio de Janeiro
Equipment: 6 L-49 Constellations; 5 PBY-5A's; 19 DC-3's
Total Employees: 3,850
Pilots Employed: 213

Real S/A—Transportes Aereos, Rua Conselheiro Crispiniano, 379-8° andar, Sao Paulo
Equipment: 28 DC-3's; 4 C-46's
Total Employees: 1,300
(Passenger and Cargo)

S. A. Empresa de Viacao Aerea Rio Grandense (Varig), Avenida Borges de Medeiros 453, Porto Alegre
Equipment: 20 C-47's; 3 Lockheed Electras; 12 Curtis Commandos

Servicos Aereos Cruzeiro do Sul, Ltda, (Cruzeiro), Avenida Rio Branco, 128, P. O. Box 190, Rio de Janeiro
Equipment: 2 DC-4's; 23 DC-3's; 6 AT-11's; 8 C-47's
Total Employees: 2,635
Pilots Employed: 135

Sociedade Anonima Viacao Aerea Gaucha (SAVAG), Edificio Camara do Commercio, Rio Grande
Equipment: 6 Lockheed Lodestars

Transportes Aereos Bandeirantes (TABA), Rua Mexico 11, Rio de Janeiro

Transportes Aereos Nacional Ltda, Av. General Justo 275, anexo 13, 7° andar, Rio de Janeiro

Transportes Aereos Salvador, Avenida Joana Angelica, 8, Salvador, Bahia

Viacao Aerea Brasil S/A (VIABRAS), Av. General Justo 275, anexo 13, 7° andar, Rio de Janeiro

Viacao Aerea Santos Dumont, S. A. (VASD), Ave. Franklin Roosevelt 137, Sao Paulo
Equipment: 2 DC-3's

Viacao Aerea Sao Paulo, S. A. (VASP), Rua Libero Badaro, 89 Sao Paulo
Equipment: 21 DC-3's 6 Scandias

British Guiana

British Guiana Airways, Ltd., 32 Main St., Georgetown
Equipment: "Irelands"; Grummans G-21 and Dakotas (C-47's)

Chile

Linea Aerea del Pacifico Sur, Ltda. (LIPA SUR), 1118 Agustinas, Casilla 1001, Santiago
Equipment: 3 DH Rapides
Linea Aerea Nacional de Chile (LAN), Los Cerillos, Santiago
Equipment: 4 Lodestars; 6 Electras; 6 DC-3's; 4 Martin 202's; 12 DH Doves; 1 Bonanza

Colombia

Aerotaxi, S. A. (AEROTAXI), Calle 13 No. 13-60, Bogota
Equipment: 1 Norseman; 1 Cessna 170; 7 Cessna 195's
Aerovias Nacionales de Colombia (Avianca), Parque de Santander, Bogota
Equipment: 6 DC-4's; 18 DC-3's; 8 C-47's; 2 C-54's; 2 PBY-5A's; 5 C-46's; 2 L-749A's
Aviacion Refrigeracion Y Pesca (AFRYPESCA), Avenida Jimenez 11-28, Bogota
Lineas Aereas Nacionales Consolidadas S. A. (LANSA), Calle 34, No. 40-53, Barranquilla
Equipment: 10 DC-3's; 2 C-47's
Total Employees: 700
Pilots Employed: 52
Lineas Aereas Trasatlanticas Colombianas Ltda. (LATCO), Carrera 44, No. 35-27, Barranquilla
Equipment: 4 C-46's
Total Employees: 66
Pilots Employed: 8
Lineas Interamericanas Aereas, S. A. (LIA), Av. Jimenez, No. 8-60, Bogota
Equipment: 3 C-46's
Total Employees: 84
Pilots Employed: 12
Sociedad Aerea del Tolima, S. A. (SAETA), Calle 19 No. 6-39—6-41, Bogota
Equipment: 3 DC-3's; 2 C-47's
Sociedad Aeronautica Medellin S. A. (SAM), Avenida 1° de Mayo 49-100, Apartado Aereo 1085, Medellin
Equipment: 5 C-46's; 3 C-47's
Total Employees: 323
Pilots Employed: 28
Sociedad Occidental de Transporte Aereos (SOTA Ltda), Edificio Banco de Bogota, Cali
Equipment: C-46's
(Passenger and Cargo)
Taxi Aereo de Santander (TAXADER), Apartado Postal No. 688, Bucaramanga, Santander
Equipment: 2 Stinsons; 2 Beavers
On Order: 1 Beaver
Total Employees: 17
Pilots Employed: 2
(Cargo)

Costa Rica

Aerovias Occidentales, S. A., San Jose
Equipment: 2 Boeing 247D's; 1 Norseman
Compania de transportes Aereos Centro-Americanos de Costa Rica (Taca de Costa Rica), San Jose
Equipment: 4 DC-3's
Total Employees: 192

(Continued on page 138)

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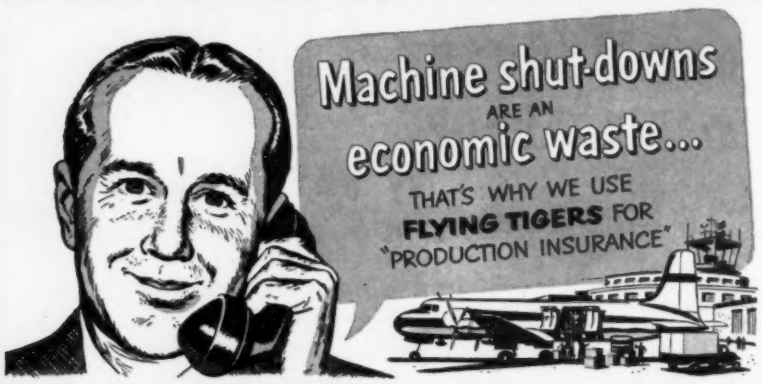
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Airline Directory

Lineas Aereas Costarricenses, S. A. (Lacsa), Avenida la. No. 39 E., Box 1531, San Jose

Equipment: 2 DC-3's; 3 C-46's
Total Employees: 127
Pilots Employed: 9

Cuba

Aerovias Cubanas Internacionales, S. A. (Aerovias de America), Trocadero 55, Habana

Equipment: 2 DC-4's
Total Employees: 34
Pilots Employed: 10

Aerovias "Q," S. A., Cienfuegos 72, Habana

Equipment: 2 DC-4's
On Order: 2 C-54's

Compania Cubana de Aviacion, S. A. (Cubana), 23 No. 105, Vedado, Habana

Equipment: 8 DC-3A's; 2 DC-4's

Cuba Aeropostal, S. A., Apartado Postal 302, Habana

Equipment: 4 C-46's; 1 DC-3

Expreso Aereo Inter Americano, S. A. (EXPRESO), Prado 204, Habana

Equipment: 3 C-46's

Dominican Republic

Compania Dominicana de Aviacion, C. Por. A. (CDA), Ciudad Trujillo

Equipment: 4 C-46's; 2 DC-3's; 1 Twin Engine Beechcraft; 1 DH Beaver

Ecuador

Aero Transporte Ecuatoriano, C. A. (ATECA), Guayaquil, Ecuador

Aerovias Ecuatorians, C. A. (AREA), P. O. Box 2226, Quito

Equipment: 2 Boeing S-307's; 2 DC-3's; 1 C-46

Total Employees: 200
Pilots Employed: 14
(Scheduled passenger and cargo)

Sociedad Anonima Nacional de Transportes Aereos (SANTA), Casilla 3182, Quito

El Salvador

Taca International Airlines, S. A., San Salvador

Equipment: DC-4's

Guatemala

Empresa Guatemalteca de Aviacion (AVIATECA), 12 Calle Poniente 6, Guatemala

Equipment: 6 C-47's; 2 DC-2's; 1 46-D; 1 Norseman

Total Employees: 282
Pilots Employed: 8

Haiti

Corps D'Aviation de L'Armee D'Haiti, Bowen Field, Port-au-Prince

Equipment: C-45; DC-3

Honduras

Servico Aereo de Honduras, S. A. (SAHSA), Avenida Colony Cuarta Calle Tegucigalpa, D. C.

Equipment: 4 DC-3's

Transportes Aereos Centro-Americanos, S. A. (Honduras), Tegucigalpa

Transportes Aereos Nacionales, S. A. (TAN), Tegucigalpa, D. C.

Jamaica

British Caribbean Airways, Ltd., Airways House, Kingston

Caribbean International Airways Ltd. (CIA), 134 Harbour St., Kingston

Equipment: 2 PBY-5A's
On Order: 1 Grumman Goose
Total Employees: 40
Pilots Employed: 5

Mexico

Aeronaves de Mexico, S. A. (Aeronaves), Balderas 44, Mexico, D. F.
Equipment: 9 DC-3A's; 1 C-47; 1 DC-4

Aero Transportes, S. A. (ATSA), Ejido No. 7-A, Mexico, D. F.
Equipment: 4 DC-3's; 1 Beechcraft AT-11

Aerovias Guest, S. A., Paseo de la Reforma, 95, Mexico D. F.
Equipment: 3 DC-4's

Aerovias Reforma, S. A. (REFORMA), Paseo de la Reforma No. 8, Mexico
Equipment: 12 DC-3A's; 1 DC-2; 6 Boeing 247's; 4 Avro Ansons
On Order: 2 DC-4's
Total Employees: 697
Pilots Employed: 47

American Airlines de Mexico, S. A., Avenida del Ejido 7, Mexico, D. F.
(Not an Operating Company)

Cia Mexicana de Aviacion S. A. (MEXICANA), Balderas 36, P. O. Box 901, Mexico, D. F.
Equipment: 4 C-47's, 15 DC-3A's, 1 C-54; 5 DC-4's; 2 DC-6's
Total Employees: 2,156
Pilots Employed: 168

Eastern Air Lines, S. A., Edificio Eastern Air Lines, Reforma Y Morelos, Mexico, D. F.
(Not an Operating Company)

Lineas Aereas del Pacifico, Avenida Ruiz 40, Ensenada, B. Cfa.
Equipment: DC-3; C-47; C-46

Lineas Aereas Mexicanas, S. A. (Lamsa), Edificio Internacional Paseo de la Reforma No. 1, Mexico, D. F.
Equipment: 7 DC-3's
Total Employees: 416
Pilots Employed: 43

Taca de Mexico, S. A., Avenida Juarez 93, Mexico, D. F.
(Not an Operating Company)

Transportes Aereos Tampico, S. de R. L. de C. V. (TAT), Olmosy Altamira Tampico, Tamps.
Equipment: 3 DC-3A's; 2 Avro Ansons; 3 Cessnas
Total Employees: 78
Pilots Employed: 8

Transportes Aereos Mexicanos, S. A. (Tamsa), Calle 62 No. 495, Merida, Yucatan

Netherlands West Indies

K. L. M. Royal Dutch Airlines, West Indies Division, 1-2 Bitterstraat, Willemstad
Equipment: 7 DC-3's; 4 DC-4's

Nicaragua

Compania Nacional Taca de Nicaragua, S. A., Managua

Lineas Aereas de Nicaragua, S. A. (La Nica), Managua
Equipment: 4 C-47's; 1 Boeing 247-D

Panama

Cia. Panamena de Aviacion (COPA), 20 Avenida A, Panama, R. P.

Taca Airways, S. A., Ave. T. Rivoli 1, Panama City
(Not an Operating Company)

(*Continued on page 140*)

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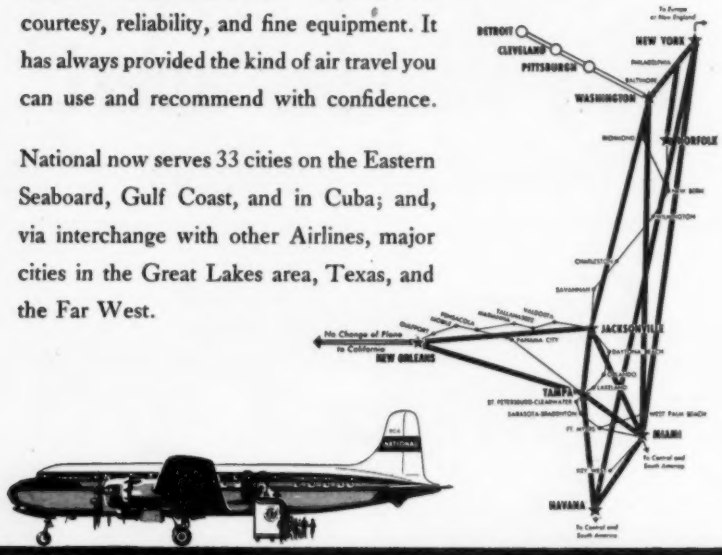
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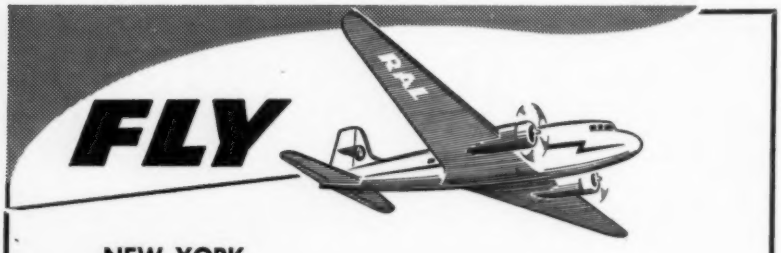
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Airline Directory

Paraguay

Aerovias Paraguatas, S. A., Asuncion (Not in Operation)

Linea Aerea de Transport Nacional (LATN), Asuncion

Peru

Compania de Aviacion "Faucett," S. A., Hotel Bolivar 926, P. O. Box 1429, Lima

Equipment: 4 DC-4's; 7 DC-3's; 7 Faucett Monoplanes

Transportes Aereos Militares, Limatambo Airport, Apart. 1414, Lima

Equipment: 6 C-47A's; 2 C-47B's; 4 PBY-5A's; 6 Dragon Rapides; 1 Beechcraft; 3 Stinsons; 4 Beavers

Trinidad

British West Indian Airways Ltd. (BWIA), Airways House, Chacon St., P. O. Box 604, Port-of Spain

Equipment: 8 Vickers Vikings; 2 Lodestars

Uruguay

Compania Aeronautica Uruguaya, S. A. (Causa), Calle Colonia 1068, Montevideo

Primeras Lineas Uruguayas de Navegacion Aerea (P.L.U.N.A.), Uruguay 1107, Montevideo

Venezuela

Aerovias Venezolanas, S. A. (AVENSA), Edificio Banco Union Chorro a Dr. Diaz., Caracas

Equipment: 18 DC-3A8's; 2DC-4's

Aerovias Venezuela Europa (A. V. E.), Edificio Paris, Plaza Candelaria, Caracas

Equipment: DC-4's

Linea Aerea Taca de Venezuela, C. A., Conde a Carmelitas, Edificio Taca, Caracas

AFRICA

Aden Airways, Ltd., Khormaksar

Equipment: 6 DC-3's

Total Employees: 165

Pilots Employed: 22

Algeria

Compagnie Air Algerie, 46 Bd. St.—Saens, Algiers

Equipment: 9 C-47's; 6 SO 30 Bretagne; 1 Brequet 761

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Societe Africaine des Transports Tropicaux (Aero Africaine) 26 bis, Rue Sadi-Carnot, Algiers

Equipment: 9 Lodestars

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Angola

Divisao dos Transportes Aereos de Angola (DTA), Caixa Postal 79, Luanda

Belgian Congo

Societe Anonyme Belge D'Exploitation de la Navigation Aerienne (SABENA), Singer Bldg., 7 Blvd., Albert ler, Leopoldville

Egypt

Misrair, S. A. E., Almaza Airport, Heliopolis, Cairo
Equipment: 2 Beechcraft 185's; 1 Bonanza; 7 Vickers Viking; 3 Languedocs
Services Aeriens Internationaux d'Egypte (SAIDE), 37 Rue Abdel Khalek, Sarwat Pacha, Cairo

Ethiopia

Ethiopian Airlines, Inc., P. O. Box 1755, Jigjiga Bldg., Addis Ababa
Equipment: 2 Convair Liners; 1 Norseman; 8 C-47's

Kenya Colony

East African Airways Corp. (EAAC), Airways Terminal, Sadler St., Nairobi
Equipment: 3 Dakotas; 10 Lodestars; 2 Dominies

Liberia

Liberian National Airways, Robertsfield Airport, Terminal, Harbel
Equipment: 3 DC-3's

Morocco

Societe Cherifienne de L'Air (Air Atlas), 167, avenue Poeymirau, Casablanca
Equipment: 6 DC-3's
Total Employees: 187

Mozambique

Divisao de Exploracao dos Transportes Aereos (DETA), Rua Araujo 103, Lourenco Marques

Nigeria

(West Africa)
West African Airways Corporation (WAAC), P. O. Box 136, Airways House, Lagos
Equipment: 10 Doves; 2 Wayfarers; 2 Bristol Freighters

Southern Rhodesia

Central African Airways Corp. (CAAC), P. O. Box 1979, Salisbury
Equipment: 9 Vikings; 5 DH Doves; 6 Beavers

Sudan

Sudan Airways, Gordon Ave., P. O. Box 253, Khartoum
Equipment: 4 DH Doves

Tunisia

Societe Tunisienne de L'Air (Tunis Air), 1 Rue d'Athenes, Tunis
Equipment: 4 DC-3's

Union of South Africa

Commercial Air Services (PTY) Ltd. (COMAIR), P. O. Box 2245, Johannesburg (Rand Airport, Germiston)
Equipment: 2 Cessna 195's; 2 Cessna 170's; 6 Cessna 140's; 2 DH Doves
Total Employees: 40
(Scheduled and non-scheduled passenger and cargo service)
South African Airways—Suid-Afrikaanse Lugdiens, Rand Airport, Germiston, Johannesburg
Equipment: 4 Constellations; 7 DC-4's; 4 DC-3's; 11 Lodestars; 1 Dove
Total Employees: 2,041
(Operated by South African Government)
Tropic Airways (PTY) Ltd., 204, His Majesty's Building, Johannesburg
(Passenger and freight charter operations)

ASIA

Ceylon

Air Ceylon Limited, P. O. Box 692, 3, Lotus Road, Fort, Colombo 1
Equipment: 2 DC-4's; 2 DC-3's
Total Employees: 163

China

Sino-Soviet Aviation Corporation (Hamiata), Tihwa

Formosa

Civil Air Transport (CAT), 46 Chung Shan Road, Second Section, Taipeh
Equipment: 4 C-47's; 23 C-46's
Total Employees: 1,693

French Indochina

Air Vietnam, 5 Quai le Myre de Vilers, Saigon
Avions Taxis Indochine (ATI), 92 Rue Pellerin, Saigon
Equipment: 1 Nord; 7 Beechcraft 18's
Societe des Transports Aeriens de L'Estreme Orient (COSARA), 5-13 Rue Turc, Saigon
Societe Indochinoise de Transports Aeriens (SITA), 5 Quai le Mayre de Vilers, Saigon

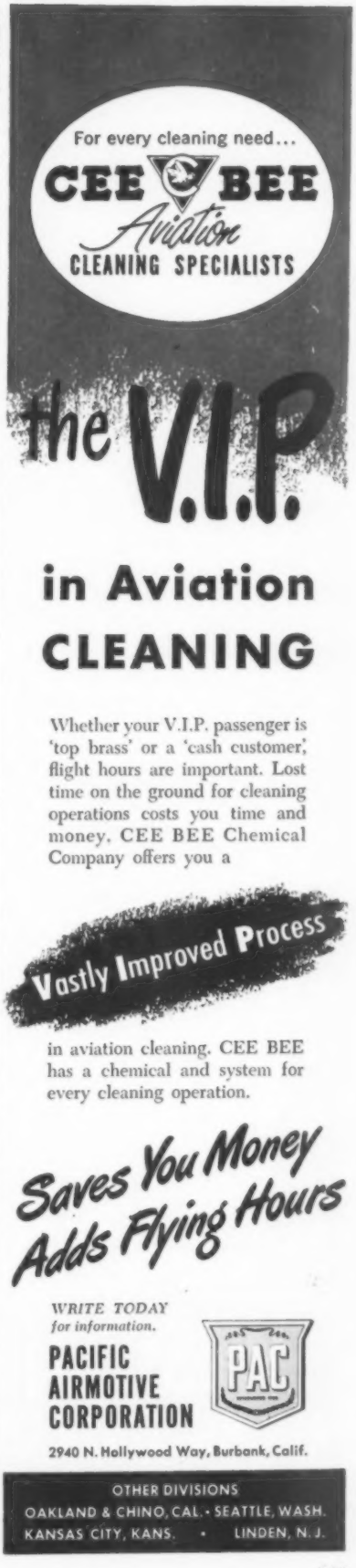
Hong Kong

Cathay Pacific Airways, Ltd., 1 Connaught Rd., Central, Hong Kong
Equipment: 1 DC-4; 2 DC-3's
Hong Kong Airways Ltd., 18 Pedder St., Hong Kong
Equipment: DC-3's; DC-4's

India

Air Services of India, Ltd., (ASI), Scindia House, Dougall Rd., Ballard Estate, Bombay
Equipment: 8 Dakotas; 3 L-5 Sentinels
Air-India International Ltd., Registered Office: New India Assurance Bldg., Mahatma Gandhi Rd., Fort, Bombay Administrative & Engineering Offices: Bombay Airport, Santa Cruz (East), Bombay 25
Equipment: 4 Lockheed Constellations
Total Employees: 232
Pilots Employed: 26
Air-India Ltd., Registered Office: New India Assurance Bldg., Mahatma Gandhi Road, Fort, Bombay Administrative & Engineering Offices: Bombay Airport, Santa Cruz (East), Bombay 25
Equipment: 11 DC-3's; 7 Vikings; 1 DC-4
Total Employees: 3,123
Pilots Employed: 72
Airways (India) Ltd., Airways House, P-37 Mission Row Extension, Calcutta, 13
Equipment: 16 DC-3's; 2 DH Doves
Bharat Airways, Ltd. (Birla Line), Hindustan Bldg., 4, Chittaranjan Ave., Calcutta, 13
Equipment: 10 Dakotas; 1 Avro; 1 Sentinel; 2 Skymasters
Pilots Employed: 41
Deccan Airways (Indian), Begumpet Airport, Begumpet I.P.O., Hyderabad, Deccan
Equipment: 10 Dakotas; 1 Leopard Moth; 1 Argus Fairchild

(*Continued on page* 142)





Airline Directory

Himalayan Aviation Ltd., 9A, Esplanade East, Calcutta
Equipment: 7 DC-3's
Total Employees: 300
Pilots Employed: 20

Indian National Airways Ltd. (INA), Malhotra Bldg., Queensway, New Delhi
Equipment: 5 Vickers Vikings; 9 Dakotas; 1 Twin Beech; 1 Single Beech

Kalinga Air Lines, Suite No. 140, Grand Hotel, Calcutta, 13
Equipment: 6 DC-3's; 1 PBY-5A; 1 L-5
Total Employees: 300
Pilots Employed: 18

Iran

Iranian Airways Company, Av. Shah-Reza, Tehran
Equipment: 5 DC-3's; 2 C-61-3 Fairchilds; 3 DH Doves

Iraq

Iraqi Airways (Iraq State Railways), Baghdad, West
Equipment: 3 Vickers Vikings; 3 DH Doves

Israel

El Al Israel Airlines, Ltd. (EL AL), 31 Rothschild Blvd., P. O. Box 438, Tel-Aviv
Equipment: 3 Constellations; 4 DC-4's; 7 C-46's
Total Employees: 754
Pilots Employed: 36

Korea

Korean National Airlines, Head Office: No. 8, 2nd Ka, Choong-Ang Dong Pusan

Japan

Japan International World Airways, Kato Bldg., Nihonbashi 2-Chome, 2-Banchi Tokyo

Lebanon

Air Liban, Rue du Parlement, Beirut
Equipment: 4 DC-3's; 1 Languedoc

Middle East Airlines Co., S. A. (MEAL), Parliament Square, P. O. Box 206, Beirut
Equipment: 6 DC-3's; 2 Magister Hawks

Pakistan

Orient Airways Ltd., Orient House, Karachi Airport, Karachi-11
Equipment: 18 DC-3's; 3 Convair 240's; 1 Expeditor; 2 L-5 Sentinels

Philippine Islands

Philippine Air Lines (PAL), M.R.S. Building, Plaza Cervantes, Manila

Saudi Arabia

Saudi Arabian Airlines, Jidda
Equipment: 13 DC-3's; 5 Bristol Wayfarers; 4 Lockheed Lodestars
(Owned by Saudi Arabian Government; managed under contract by Trans World Airlines, Inc.

Thailand

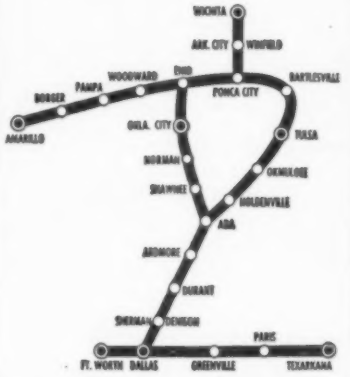
Pacific Overseas Airlines (SIAM) Ltd., 39 Surawongse Rd., Bangkok
Equipment: 2 DC-3's; 2 C-54's; 1 PBY

(*Continued on page* 144)

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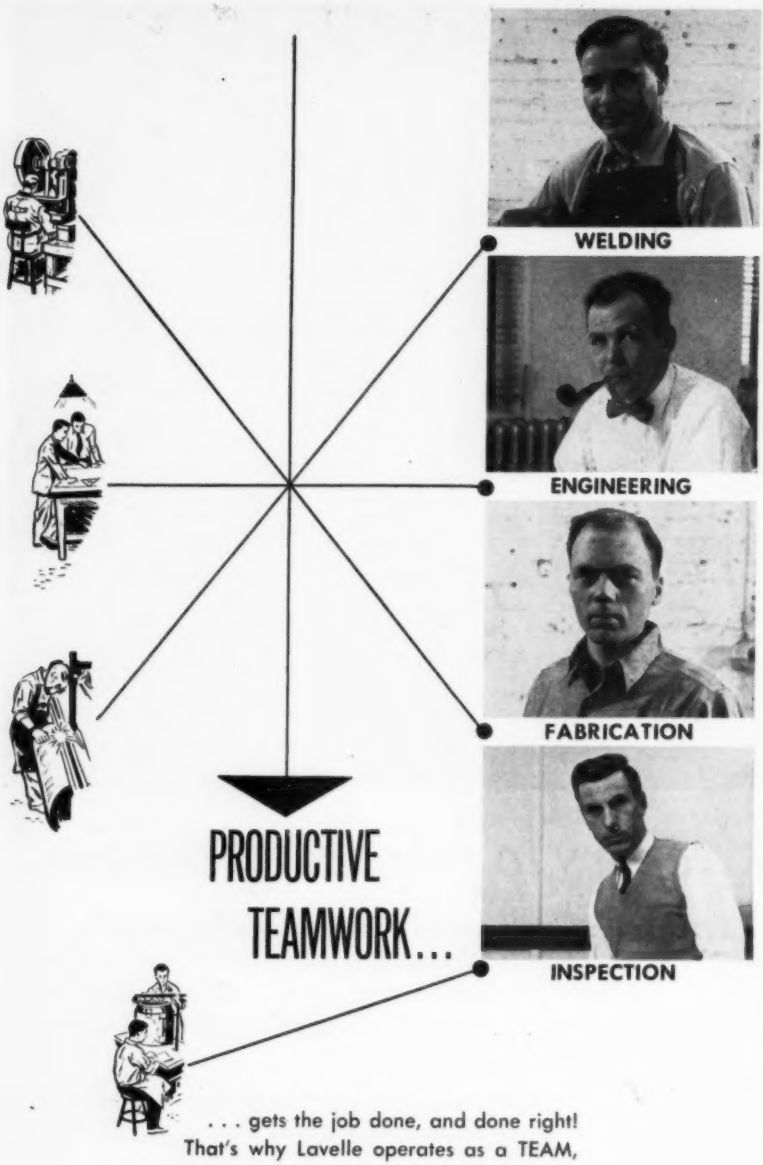
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Thai Airways Co. Ltd., Airway Building, 6 Lan Luang Rd., Bangkok
Equipment: DC-3; Bonanza; Rearwin; Norseman

Trans-Jordan

Arab Airways Association, Ltd. (A.A.A), Station Road, P. O. Box 367, Amman
Equipment: 5 DH Rapides; 2 Airspeed Consuls; 1 Chrislea Ace; 1 Proctor; 1 Tiger Moth

Turkey

T. C. Devlet Hava Yollari Genel Mudurlugu D.H.Y. (Turkish State Airlines), Turkish State Airlines, Ankara
Equipment: 30 C-47's; 3 DC-3's; 5 JU-52's; 6 DH-89's
Total Employees: 842

Union of Burma

Union of Burma Airways (UBA), 104, Strand Road, Rangoon
Equipment: 3 DH Doves; 9 C-47's

AUSTRALIA, NEW ZEALAND, MALAYA

Australia

Airlines (W A.) Ltd., 55 St. Georges Terrace, Perth, Western Australia
Equipment: 3 DH 104 Doves; 2 Avro Ansons

Ansett Airways Pty. Ltd. (Ansett), Commonwealth Airport, Essendon, Victoria
Equipment: 6 C-47's
Total Employees: 300

Australian National Airways Pty. Ltd. (A.N.A.), 390 Flinders Street, Melbourne, C 1., Aerodrome, Essendon, Victoria, W. 6
Equipment: 9 DC-4's; 25 DC-3's; 3 Bristol 170 Freighters

Barrier Reef Airways Pty. Ltd. (REEFAIR), Civil Aviation Flying, Boat Base, Hamilton, Brisbane, Queensland
Equipment: 2 Sandringham Mk IV; 2 Catalina PB2B's
Total Employees: 47
(Scheduled & non-scheduled passenger & cargo service throughout Southwest Pacific Area)

British Commonwealth Pacific Airlines Ltd., A.P.A. Building, 53 Martin Place, Sydney, N. S. W.

Butler Air Transport Proprietary Ltd., Kingsford Smith Aerodrome, Mascot, Sydney
Equipment: 6 C-47's; 3 Avro Ansons; 2 DH 89's

Connellan Airways Ltd. (Connellan), Alice Springs, N. T.
Equipment: 2 DH Rapides 89A's; 2 DH 90's; 1 Auster Aiglet; 2 DH 82's; 1 Beechcraft D-17

East-West Airlines Ltd. (EWA), P. O. Box 249, Tamworth Aerodrome, Tamworth, N. S. W.
Total Employees: 50

Guinea Airways Ltd. (G. A. L.), Airways Houst, 132 N. Terrace, Adelaide
Equipment: 3 DC-3's

MacRobertson-Miller Aviation Co. Pty. Ltd. (M. M. A.), 194 St. Georges Terrace, Perth, Western Australia

Overland Air Services Pty. Ltd., Lingsford Smith Airport, Mascot, Sydney
Equipment: 2 Lockheed Lodestars; 2 Avro Ansons
On Order: 2 Lockheed 10's

Qantas Empire Airways Ltd. (Qantas), Shell House, Carrington St., Sydney, New South Wales
Equipment: 6 Constellations; 2 Lancastrians; 4 Sandringham Flying Boats; 13 DC-3's; 5 DC-4's; 9 DH-84's; 1 Dh-83; 3 DHA-Drovers; 4 PB 282's
On Order: 3 Super Constellations (1049C)
Total Employees: 4,187

Queensland Airlines Pty. Ltd., Eagle Farm Airport, Box 217D, G. P. O. Brisbane
Equipment: 3 DC-3's

South Coast Airways Pty. Ltd. (S. C. A.), Box 151, Wollongong, N. S. W.
Equipment: 3 Ansons; 1 Lockheed 10; 1 C-34; 3 DH-82's; 1 Desoutter
Total Employees: 15
Pilots Employed: 5

Townsville & Country Airways, 41 Flinders St., Townsville, Queensland
Equipment: 1 DC-3

Trans Oceanic Airways Pty. Ltd., Flying Boat Base, Rose Bay, Sydney, N. S. W.
Equipment: 3 Short Solent Flying Boats; 3 Short Hythe Flying Boats

Trans Australia Airlines (TAA), 339 Swanton St., Box 2806AA, G. P. O., Melbourne, C. 1., Victoria
Equipment: 20 DC-3's (Passenger); 3 DC-3's (Freighter); 4 DC-4's; 5 Convair Liners; 4 DH-84's; 4 DH-A3 Drovers
Total Employees: 3,662
(Operating company for Australian National Airlines Commission)

Woods Airways Pty, Ltd., Box K 783, G. P. O., Perth
Equipment: 2 Avro Ansons

New Zealand

New Zealand National Airways Corp., P. O. Box 3038, Wellington, C. 1.
Equipment: 2 Douglas (Freighters); 15 DC-3's; 6 DH Dominies; 3 DH Moth

Tasman Empire Airways Ltd. (TASMAN), Mechanics Bay, C. P. O. Box 2201, Auckland
Equipment: 1 Catalina Flying Boat (training); 5 Solent Flying Boats
Total Employees: 604

Malayan Union

Malayan Airways Ltd., Ocean Building, Singapore
Equipment: 10 DC-3's; 1 Airspeed Consul

Republic of Indonesia

Garuda Indonesian Airways N. V., Djalan Nusantara 15, Djakarta
Equipment: 22 Dakotas; 8 Catalinas; 8 Convair Liners
Total Employees: 3,600
Pilots Employed: 95

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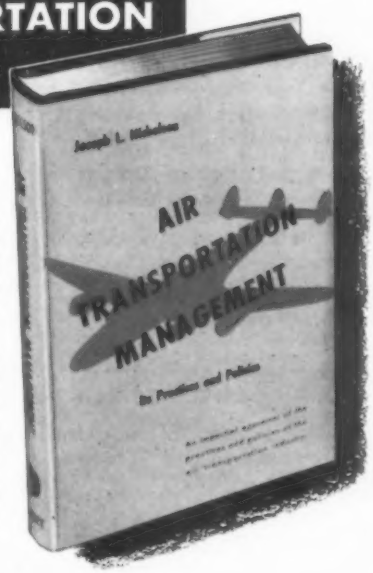
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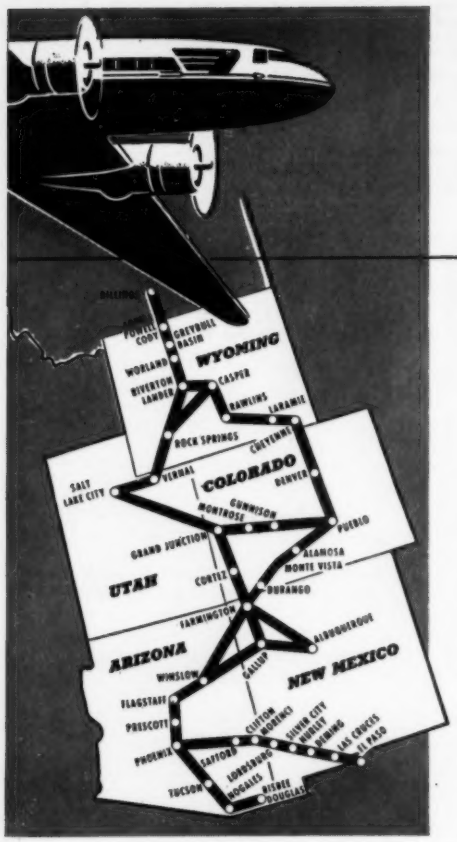
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Advertisers in this Issue

ADVERTISERS — PAGE

A

A C Spark Plug, Div. of General Motors Corp. 41
Ace Products Company 146
Air Associates, Inc. 48, 81
Aircraft Radio Corporation 90
Airesearch Manufacturing Company 32, 33
Air France 38, 39
Airwork Corporation 113
Allied Brief Case 148
Allison Division, General Motors Corporation 83
A M C Supply Division, Air Accessories, Inc. 133
American Airlines, Inc. 79
American Electrical Heater Company .. 125
American Phenolic Corporation 68

B

Beech Aircraft Corporation 71
Bendix Aviation Corporation
Bendix Products Division 61
Eclipse Pioneer Division .....3rd Cover
Radio Communications Division 128, 129
Scintilla Magneto Division 66, 80
Barber-Colman Company 94
Boeing Airplane Company 119
Braniff Airways, Inc. 116
Breeze Corporation, Inc. 100
British European Airways 134
The Brunsene Company, Div. of The H. M. Sawyer & Son Company .. 145

C

Canadair Limited 91
Capital Airlines, Inc. 5
Cee Bee 141
Central Airlines, Inc. 143
Champion Spark Plug Company 108
Chance Vought Aircraft Division, United Aircraft Corporation 8
Chase Aircraft Company 6
Chicago & Southern Air Lines, Inc. 11
Cities Service Oil Company 13
Cleveland Industrial Tool Company 90
Cleveland Pneumatic Tool Company ... 65
Collins Radio Company 28, 29
Consolidated Industries, Inc. 102
Consolidated Vultee Aircraft Corporation .....Front Cover
Continental Air Lines, Inc. 137

D

Delta Air Lines, Inc. 35
Douglas Aircraft Company, Inc. 12

E

Electric Auto-Lite Company, The 49
Esso Standard Oil Company 101

F

Fairchild Engine & Airplane Corporation Fairchild Guided Missiles Division ... 7
Flightex Fabrics, Inc. 132
Flying Tiger Line Inc., The 138
Frontier Airlines, Inc. 146

G

General Electric 24
Goodall Fabrics, Inc. 16
B. F. Goodrich Company, The 10
Goodyear Tire & Rubber Company, Inc., The 3

H

Hawaiian Airlines Limited 132
Hertz Driv-Ur-Self System, Inc. 36
R. M. Hollingshead Corporation 114
Hydro-Aire, Incorporated 96

J

Jack & Heintz, Incorporated 106

K

Klincher Locknut Corporation 135
Kollsman Instrument Corporation 143

L

Lake Central Airlines, Inc. 45
Lavelle Aircraft Corporation 144

M

Glenn L. Martin Company, The 123
Minneapolis-Honeywell Regulator Company, Aeronautical Division 2
Monsanto Chemical Company 54
Motor Generator Corporation 99

N

National Airlines, Inc. 140
National Car Rental System, Inc. 131
Northeast Airlines, Inc. 104
Northwest Airlines, Inc. 14

P

Pacific Airmotive Corp. 47
Pan American-Grace Airways, Inc. 73
Pan American World Airways, Inc. 53
Paper Manufacturers Company 92
Philippine Air Lines 69
Phillips Petroleum Company ....Back Cover
Piedmont Airlines 117
Pioneer Airlines, Inc. 143

R

Reaction Motors, Inc. 105
Remington Rand, Inc. 62
Republic Aviation Corporation 59
Riddle Aviation Company 139
Robinson Airlines Corporation 140
Robinson Aviation, Inc. 132

S

Scandinavian Airlines System 137
Simmonds Aerocessories, Inc. 84
Sinclair Refining Company 88, 89
Southern Airways, Inc. 45
Southwest Airways Company 139
Spartan Aero Repair 86
Sperry Gyroscope 75
Surface Combustion Corporation 111

T

Thermix Corporation, The 70
Thompson Aircraft Tire Corporation ... 15
Transport Equipment Company 84
Trans-Texas Airways 130
Trans World Airlines 56, 57
Tulsa Municipal Airport 115

U

United Air Lines 127

V

Vickers, Incorporated 77

W

Western Air Lines, Incorporated 142
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News at Deadline

Long-Range C-119H to Make First Flight Soon

An enlarged long-range model of Fairchild's Packet, the C-119H, will make its first flight in about a month.

The plane has been designed to fly slower, both at cruising and drop speeds, than its predecessors. A larger wing (40% more area) permits a stall speed drop of about 20 knots and provides better stability and control.

Powerplants in the prototype of the "H" are Wright R-3350 Turbo-Cyclone compound engines, rated at 3,500 horsepower, driving Hamilton Standard propellers. In production models, Fairchild expects to use the same engine with horsepower increased to 3,700, driving Aeroproducts propellers.

Take-off weight will be 85,450 lbs. against 65,300 in the "C" model, and landing weight is increased from 57,026 to 77,100 lbs. on a typical 900-mile radius of action mission. Cargo load on such a mission will be 21,800 lbs. compared with 6,900 lbs. Service ceiling is lower, 21,000 against 23,450 ft. and take-off distances increases from 2,400 to 2,600 ft.

LAS Plans Commercial Jet Overhaul Base

Lockheed Aircraft Service has leased 15 acres and has an option for 15 more at Ontario, Calif. for the construction of a commercial jet overhaul and modification base. Heading a supervisory staff from the LAS Boeing B-29 rehabilitation group at Pyote, Tex., is Henry H. Ogden who will head the group at the new facility. Production workers will be recruited from the labor pool in the area.

Construction plans call for more than 72,000 square feet of floor area to accommodate hangar, shop, and warehouse facilities. Scheduled for completion about Sept. 15, the base will employ around 500 people.

Spanish, Chilean Airlines Buying U. S. Transports

Two other foreign airlines are buying U. S.-built transport aircraft, according to recent reports.

Iberia, the Spanish airline, has ordered three Lockheed Super-Connies for use on projected route expansions, including a Madrid-New York service.

LAN, the Chilean national airline, was expected to make its decision late this month, following an extensive evaluation study, as to whether it would order three Douglas DC-7's or three Lockheed L-1049C Super-Constellations. Chilean government has set aside $6,000,000 to buy the airplanes and spares for LAN, which would use them to replace Martin 2-0-2's on its Santiago-Buenos Aires route and possibly on proposed new services elsewhere.

Atlantic Tourist Seats to Number 8,000 Weekly

During the peak summer season, accommodations for 8,000 trans-Atlantic tourist passengers per week will be offered by 11 international airlines which start the service in May.

Initially, 39 tourist flights will be offered each week, with progressive increases during the summer raising the weekly total to 71 by Aug. 1.

LAA'S New S-55 Damaged in Accident

Los Angeles Airways' newly acquired Sikorsky S-55 has been extensively damaged and will probably require a factory rebuild to put it back in operation.

Cause of the accident has been established as structural failure in the tail rotor permitting a spline gear to slip back on the tail rotor drive shaft causing a loss of rotor power. The accident occurred shortly after take-off from Los Angeles International Airport. Sikorsky has developed a fix in the tail rotor gear box to prevent recurrence of the failure.

Citing the S-55 accident as the "culmination of an unfortunate chain of events" straining its economic existence, LAA applied to CAB for higher mail rates. Current rate is $1.30 per plane mile for monthly mileage up to 30,000 miles and a rate of 60c for mileage in excess of 30,000.

Newark Airport Opened for Limited AF Use

After being closed to all traffic since Feb. 11, Newark Airport was officially opened to limited Air Force and New Jersey Air National Guard traffic Apr. 14.

Negotiations between the AF and the Port of New York Authority on additional hangar facilities were still going on at presstime, and initial AF Newark operations were awaiting the outcome. A few Air Force planes had landed at Newark, but operations with "national defense" implications were still pending.

Floods Close Airports; NWA Moves Base

In the wakes of the rampaging Mississippi and Missouri flood waters, at least three major airports were temporarily swamped out of operation.

At Holman Field, St. Paul, Minn., water held back by dikes forced itself up under Northwest Airlines' overhaul base, cracking hangar floors and seeping into buildings. Northwest reduced scheduled operations 15% because of the critical overhaul problem caused by the flood as employes began moving equipment to Wold-Chamberlain Field.

As the Missouri flood moved south toward Kansas City, Omaha Municipal was hit. United Air Lines transferred its operations to Lincoln, 64 miles to the southwest, moving passengers to Omaha by limousine and bus. Rosencrans Field, St. Joseph, Mo., was also reported non-operational.

At Kansas City, Trans World Airlines was prepared to shift from Municipal Airport to Grandview Airport if necessary. Sioux City Airport has been reported partially closed, with only the N/S runway operational.

Delta Orders DC-7's

Delta Air Lines is buying four Douglas DC-7's, costing $7,000,000, including spares, for delivery in early 1954. The planes will be powered by Wright Turbo-Compound R-3350's and fitted for 69 passengers.

YB-52 Flight Tested

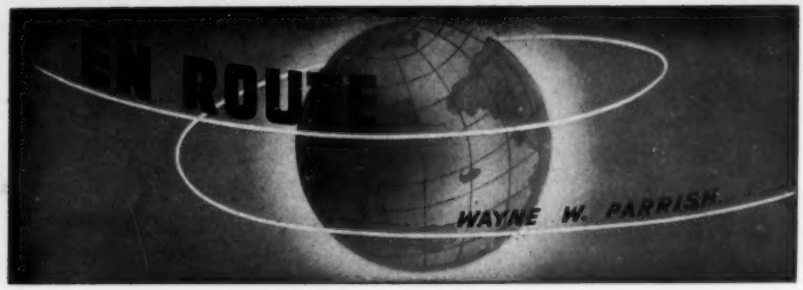
The eight-jet Boeing YB-52, Air Force heavy bomber, is to undergo additional flight testing at Larson AFB, near Moses Lake, Wash., after making its first flight recently.

C-131's for AF

Contract has been awarded by the Air Force to Consolidated Vultee Aircraft Corp. for a production quantity of the C-131, a new medium transport for air evacuation work. The plane is a new version of the basic Convair-Liner design, already in AF service as the T-29 navigation trainer.

YH-21's First Flight

Piasecki's YH-21 twin-rotor helicopter, designed for Arctic rescue service with the Air Force, has successfully completed its first flight. The YH-21, which will be a production airplane, carries 14 troops or 12 litters with a medical attendant.



Have just been down to Venezuela and can promise you a very, very interesting story or two, but this issue I want to get caught up on my travel hobbies if you'll bear with me.

✣ ✣ ✣

Poor Barber. It seems that I'm known in Venezuela as the guy who gets barbers fired. Back in August, 1949, I was on **Capt. Eddie Rickenbacker's** deluxe Constellation flight around South America and we stopped at Caracas, capital of oil-rich Venezuela. I was overdue for a haircut so I went to the barber shop at the beautiful Avila Hotel and ordered a short one. I sure got it short, too. The barber used a straight-edge razor instead of scissors. Not only was it a hazardous project but absolutely the worst haircut I'd ever had. I said so in print.

When I arrived at the Maiquetia Airport in Venezuela in March of this year, I found out what had happened. when the "En Route" page reached **Carter Gardner,** manager of the Avila, Gardner fired the barber pronto. At first I felt sad about being responsible for a barber losing his job, but then I discovered the firing was a popular move in the American colony in Caracas. Nobody liked the haircuts, but it took this "En Route" page to get the guy bounced. So there's a new barber at the Avila and he uses scissors.

✣ ✣ ✣

Unlikely Places. Two issues ago I wrote about the difficulties of furthering my hobby of visiting every airport served by a scheduled airline in the U. S. and I mentioned that I had been unable to get to "such unlikely places as Douglas, Ariz., and Minot, N.D."

Well, I sure stirred up something there. Sure enough, that issue got distributed at the American Association of Airport Executives convention at Fort Worth, and who should show up at the meeting but **Charlie Jones,** who manages the Bisbee-Douglas Airport. R. W. F. ("Bob") Schmidt, who manages Tucson Airport, and who never misses a trick or a gadget, prefaced his convention speech with a plea for all AAAE members to call Jones by the unlikely name of "Unlikely Jones," and said Jones was going to sue me for libel.

It turns out that Jones is a prince of a guy as his photo on this page will indicate. I told him to be sure and make it a $5 million suit because $1 million doesn't go far these days. I'll think twice before I call any city an unlikely place again.

And as for Minot, N. D., I really heard from **Bill Stern,** who is president of The Dakota National Bank of Fargo and a director of Northwest Airlines. Just why Bill Stern is plugging so hard for Minot I wouldn't know, but Bill insists that Minot is not an unlikely place and is the third largest city in North Dakota and has an excellent airport and is in the rich Williston Oil Basin. Okay, I'll go along that Minot isn't unlikely, but I'd like a tip on how to get there easily. Wonder if it's dug out of that snowbank yet?

Bell Aircraft Corp. Photo



CHARLIE ("UNLIKELY") JONES (left), manager of Bisbee-Douglas Intl. Airport, Arizona, and R. W. F. ("Bob") Schmidt, manager of the Tucson (Ariz.) Airport Authority, at the AAAE convention at Fort Worth.

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Amarillo-Tulsa. That local service route of Central Airlines between Amarillo and Tulsa via Borger, Pampa, Woodward, Enid, Ponca City and Bartlesville is certainly jinxed as far as I'm concerned. Many times I've tried to work it into a cross-country schedule. In February I was actually ticketed but my bag got lost in El Paso and I had to cancel out. Now I've made another attempt, on April 3, and failed. This time Braniff Airways was six and a half hours late on a flight from Fort Worth to Amarillo where I was going to stay overnight, so I had to cancel out again. Looks to me as though I'm going to have to take a month off in order to make that hedge-hopping trip across the plains.

Amon Carter. I've finally made the grade in Texas. Down in Fort Worth that legendary character, publisher of the Fort Worth Star-Telegram and long-time director of American Airlines, presented to me one of his famous Shady Oak Farm 10-gallon hats, as handsome a sombrero as ever graced a balding head in a Texas wind. I also rated a bottle of 25-year-old Scotch from his private stock. I've really moved up the social ladder now. Nowhere else to go unless I become a wax figure in Madame Tussaud's museum in London.

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Lolita. Ive had a lot of comments from you readers about **Lolita,** the statue of a Dalmatian peasant girl that I bought last fall in Split, Yugoslavia, and which broke into several dozen pieces in transit to Washington. As I told you the statue was made of clay, insufficiently fired, and I turned out to be a helluva poor judge of what should go into statues.

But I have news for you. My long-suffering, patient, and tolerant wife, who thought I was completely nuts to pay money for that hunk of clay, set out secretly to see if she could put Lolita back together again. She got some glue and putty and advice from a ceramic shop and wonder of wonders, Lolita is back in fairly good shape. Pretty patched up, of course, but the next step is to cover her with some sort of lamination to hide the patching and putty, and Lolita will look okay. Fortunately, the head had remained intact, otherwise the job would have been impossible.

And know what? My wife is beginning to like Lolita. Thinks the lines are pretty good and graceful, after all. Isn't just everybody who can bring a young gal into his home and get her accepted, although I must say the original introduction was pretty cool. Some readers wondered how I could print her photo on this page when she was so broken up; I forgot to mention that Lolita was considered a fine work of art in Yugoslavia and had been well photographed. The artist had given me the photo.

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Male vs. Female. I always try to bring you lovely readers those intimate cozy glimpses of life which other magazines don't dare to put into print. Here's a dilly from **Louis Inwood,** the scholastic director of civil aviation for Kansas City who is forever trying to boost non-airline revenues at his muncipal airport.

Seems that in both the men's room and women's room of the airport there are four five-cent pay toilets and one ten-center. For the extra nickel you get an ultra-violet ray—sanitation de luxe. What's got Louis stopped, however, is that the 10-center in the men's room brings in double the revenue from a five-center, while in the women's room the 10-center takes in only half the revenue of a five-center. I present this baffling problem to you—not the solution—in the furtherance of worldwide sociological investigations and urge you to give weighty consideration to it. But write your comments to Inwood direct, I'm just sitting this one out.



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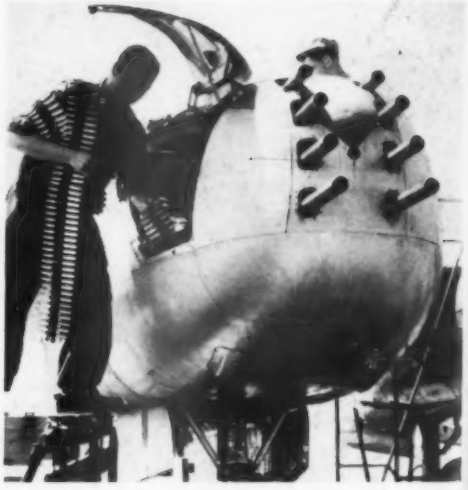
Back on June 7, 1912, Colonel Isaac M. Lewis, the inventor of the Lewis machine gun, took one of his first sample guns to College Park, Maryland, and asked that it be tried from an airplane. The commanding officer of the U. S. Army flying school there, Captain C. de F. Chandler, agreed to undertake the firing experiment himself and went aloft with his pilot, Lt. Roy T. Kirtland, in a Wright Type B plane.

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MODERN VERSION! A far cry from Captain Chandler's first machine gun experiment from the air, is this scene at a Far East air base. The U. S. Air Force ground crewman wears a scarf of "ammo" for the powerful .50 caliber machine guns, as he loads up a B-26 light bomber for a mission against the North Korean Communists.

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